Notes & Queries

T. C. W. should consult a physician.—G. S. W. will find a recipe for paste that will not sour on p. 219, vol. 30.—L. S. will find a recipe for French polish on p. 11, vol. 32.—H. H. can tin cast iron by the process described on p. 362, vol. 31.—H. V. will find full directions for tempering steel in the early chapters of "Practical Mechanism," and for constructing a small furnace on p. 235, vol. 32.—G. W. P. will find directions for making a battery for plating on p. 202, vol. 32. A good alloy for castings is described on p. 104, vol. 24.—W. M. will find a description of water filter on p. 251, vol. 31.—J. D. will find directions for hardening tallow on p. 201, vol. 24.

(1) J. E. J. says: 1. Please explain the following: "A round hole, the size of the lens, was made in each, the meniscus being contracted to ¾ inch, and the eye glass to ¼ inch diameter." A. If a lens is bad, the edge zones are cut off by a stop or diaphragm. 2. What would be the power of a telescope made as directed, with a meniscus object glass of 1 inch diameter and 48 inches focus, with an eyepiece (plano-convex) of 1 inch focus? A. Forty-eight. 3. Which would be better, the above, or an achromatic object glass of 2 inches diameter and 30 inches focus, with a plano-convex eyepiece of 1 inch focus? A. The achromatic.

(2) J. E. J. asks: What will be the power of a telescope with an achromatic object glass of 2 inches diameter and 36 inches focus, and a plano-convex eyepiece of 1 inch diameter and 2 inches focus? I wish to make the best telescope of which the cost shall not exceed $10. The above lenses will cost $8 or $9; are they as good as I can expect for the money? A. Yes. Power, 18. See previous answers for construction of eyepieces.

(3) W. A. asks: At what distance will the most powerful telescopes observe any moving object? A. Under the most favorable circumstances, about 190 times as far as it can be seen without the aid of an instrument.

(4) W. S. H. says: I wish to make a telescope of sufficient power to view objects 1 or 2 miles off. Will the following glasses do? Object glass of 3 inches diameter, 20 inches focus, achromatic; 3 double convex lenses, 1 inch in diameter, set 1½ inches apart, constituting the eyepiece. A. This is a bad form of telescope. The objective is of too short focus for the aperture, and the erecting eyepiece performs better with 4 lenses than with 3. See No. 48, September 26, 1874, and consult our optical answers for a year or two back.

(5) T. & Co. ask: We have a large lens, diameter 3½ inches. It is scratched, and needs repolishing. How can we do it? A. The scratches on your camera lenses will very slightly lengthen the necessary exposure. It would not pay to repolish them.

(6) R. H. S. says: 1. Please say what particular advantages there are in periscopic spectacles over plano-concave for near-sightedness? A. The periscopic give a larger field of view. 2. What is polarized light? A. Light waves split in two so that one ray vibrates in one plane and the other in a plane at right angles thereto. This is effected by a bundle of thin glass plates or by a Nicol's prism. 3. Is there any other method to produce the achromatic effect in lenses than by combining flint and plate glass lenses? A. The outstanding aberrations of a combination such as a microscopic objective are corrected by the opposite aberrations of the back lens and of the eyepiece. 4. What is a good work on optics? A. Silliman's "Physics," though not very recent, contains the best optical formulæ for achromatism. Atkinson's "Ganot" is atrociously deficient in this respect.

(7) A. S. asks: If a cistern is 11 feet in diameter and 9 feet deep, how many gallons will be its contents? A. Multiply the square of the diameter by 5·875 times the hight, to find the contents in U. S. gallons.

(8) J. B. C. says: I have, for this last 25 years, on every Saturday evening turned the inner side of my engine belt outside, let the engine run slow, and washed the belt well with warm water and soda, applied with cotton waste. Next, I take a piece of sheet metal and scrape well the belt, next wash with clean warm water, and dry off. I collect the waste oil from the shafting, and apply to the belt as much of it as possible. The washing must be done as quickly as possible so as not to dissolve the glued parts. I let the belt stand on the pulleys till Monday, then give another scraping and turn the belt as before. I keep the pulleys very clean. I have long been surprised at the economy I have effected, with very little trouble. I have not bought a new belt for the last ten years. There is an engine next me, 14x36 inches (mine is 12x36). I have nearly double the shafting and belts, and my neighbor cannot run with less than 38 lbs. of steam when all the belts are on the loose pulleys. Mine will run at full speed with 5 lbs. A. These suggestions will be appreciated by our readers. One must begin with a first class belt, made in the best manner, and use considerable judgment, in following the practice of our correspondent.

(9) D. L. C. asks: What causes the diurnal motion of the earth? A. The vortical movement of nebulæ, cyclones, and eddies is produced by streams of particles meeting from nearly opposite directions.

(10) F. W. M. asks: 1. Is $\frac{7}{8}$ lap on the slide valve ⅞ on one end, or is it ⅜ on one and $\frac{1}{16}$ at the other? A. On one end. 2. What is meant by the longitudinal and curvilinear seams of steam boilers? A. Longitudinal, in the direction of the length; curvilinear, around the shell. 3. Does the crank of a steam engine move six times as far while the piston is making the first inch of the stroke, as it does while it is making the middle inch, and a little over twice as far while it is making the second inch, and a trifle over 1½ times while it is making the third inch? If so, does the same variation apply to all engines regardless of length of crank? Is there any rule by which to find the distance the piston moves while the crank is describing a certain part of the circle? A. It depends upon the relative length of connecting rod and crank. You will find a table giving the desired information on p. 164, vol. 32. See also Auchincloss' treatise on "Link and Valve Motions."

(11) C. W. S. says: You state that the difference between high and low pressure is that in one the steam is condensed, in the other it is exhausted into the atmosphere. A claims that the one in which the steam is condensed is the high pressure. Is he right? A. No.

How far can sound be heard and words be understood through speaking tubes? A. Several hundred feet, so far as our experience goes.

(12) L. R. B. asks: 1. What power, as usually rated on steam engines, is required to drive a 17 inch surface planer on thin soft wood? A. From 5 to 6 horse. 2. What is needed to drive a 15 inch circular saw in 6 inches of soft wood? A. From 12 to 15. It is to be observed that these estimates are for driving the machines up to their capacity, so that the power required can be reduced considerably if less work is done by the machines. 3. What is commonly used to thin printer's ink? A. Soap is very often employed.

(13) T. McK. says: I have a small camera obscura with a double convex lens, and I find that it does not give a distinct picture of objects at unequal distances from the camera at the same time. For example, when an object 12 feet distant is distinctly shown, another 16 or 18 feet distant is indistinct, and *vice versa*. 1. What combination of lenses is necessary to produce a distinct picture of both objects at the same time? A. You should focus on the foreground, and put a cardboard stop a couple of inches in front of lens, diminishing its aperture. 2. What combination of lenses is used in photographing landscapes? Is there any difference between a landscape and portrait combination, and, if so, what is it? A. See answer No. 59, February 27, 1874.

(14) J. C. says: I have a cranberry patch of 2 acres. It is flooded with water early in November annually. The dam is made of swamp dirt, and (at the outlet) is 7 feet in width by 6 high. The water is 3 feet in depth at the place of drainage. For the past two seasons a box made of plank without bottom has been made for the water to pass through in summer, and this box closed with dirt in winter, and made in the most thorough manner; but the frost elevates the plank and the water breaks away underneath, and the vines are drained of water. The question is, is there any method of inserting anything, that it may hold water? A. It is difficult to prevent such action in very cold weather.

(15) E. E. W. asks: 1. How can I, having a lens of 16·7 inches radius on one side, calculate the radius for the other side, to make a lens of any required focal length? A. To find the principal focus of double convex lenses whose refractive index is 1·5: Divide twice the product of the radii by their sum. Quotient=focus for parallel rays. 2. How can I make it a double convex of 11·5 inches focal length? A. Second surface, 9 inches radius of curvature.

(16) J. S. asks: What width of flat belt will convey the same power as a ¾ round belt running in properly grooved pulleys? A. About 2 inches.

What will be the centrifugal force in lbs. of ten iron balls weighing 1 lb. each attached to a wheel two feet in diameter and running at a velocity of 3,000 revolutions per minute? A. The centrifugal force in lbs. is found by multiplying the weight of the body in pounds by the square of the number of revolutions per minute, and by the radius of the wheel in feet, and dividing the product by 2,935.

(17) D. W. asks: What is meant by horse power of engines? A. Horse power is a technical term for a unit of work, in a minute, equivalent to 33,000 foot pounds in that time.

(18) M. R. asks: Does a crank pin turn on its axis when an engine is at work? A. No.

How is beeswax bleached? A. There are several processes: exposure to the air, treatment with chemicals, treatment with steam. See p. 299, vol. 30.

How can I tan sheep skins when they are very dry and old? A. See p. 233, vol. 26.

(19) F. G. P. says: You said in a late issue that the cylinders of the Great Eastern were 14 feet long. Will you please tell me if they were oscillating? A. Yes.

(20) G. S. C. says: If C. B. F. will take the precaution to moisten the contents of the porous cups with the sal ammoniac solution while packing the carbons, he will be able to obtain a current as soon as the circuit is closed. I have two similar cells in which the peroxide of manganese used was in a fine powder, and the coke was likewise in powder, but a little coarser.

(21) W. E. H. asks: What work on electricity is the best in all its details? A. De la Rive's works are probably the most comprehensive upon the subject.

(22) T. M. Jr., F. P. L., J. A. T., and others.—The phenomenon you observed was unusually beautiful. Parhelia and bands of light passing through the sun are attributed to reflection from ice prisms which float, up to an inch in diameter, in summer air currents, above ½ mile high. Any change in the temperature and density of the air alters the path of the rays and inverts or distorts images like a speculum polished while unequally warm.

(23) W. A. S. asks: How shall I wash nickel, precipitated in nitric acid, by adding cyanide of potassium? A. In water. 2. How shall I insulate a copper wire above the junction with the copper plate in the bottom of a Callaud battery cell? A. With gutta percha. 3. What materials are used in making silver and gold solutions for plating with? A. See No. 26, p. 218, vol. 32.

COMMUNICATIONS RECEIVED.

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

On Kaolin. By J. T. A. H., by W. C. K., and by N. W. B.

On the Number Seven. By J. D. L.

On a Boiler Explosion. By H. W. G.

Also enquiries and answers from the following.

W. H.—S. C. H.—A. J. K.—L. M. W.—F. N.—J. T. O.—F. P. B.

HINTS TO CORRESPONDENTS.

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.

Enquiries 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.

Hundreds of enquiries analogous to the following are sent: "Who makes hydraulic motors for sewing machines? Who makes springs for propelling street cars? Who sells the best emery for grinding glass? Who sells artificial stone? Who sells iron work for aquariums? Who sells mangles? Who publishes a paper printed in phonography?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

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Table, folding, S. T. Waggoner 161,304
Telegraph insulating block, G. S. Pidgeon 161,058
Telegraph, printing, G. M. Phelps 161,151
Ticket case, L. J. Blades 161,093
Toy furniture, E. P. Woods 161,089
Toy paper, W. H. Backus 160,994
Trap, air and water, N. Middleton 161,257
Trap gate cutting machine, J. A. Lowe 161,248
Truss, H. Howe 161,233
Valve, globe and check, I. W. Brown 161,002
Valve gear, F. H. Ball 161,195
Vehicle axle lubricator, J. S. Eggleston 161,016
Vehicle, wheel, L. P. Larson 161,245
Vehicle, traction, H. H. Chapin 161,006
Veneers, cutting, J. C. Brown (r) 6,341
Vise, C. L. Kingsley 161,241
Wagon, T. Y. Van Cleave 161,302
Wagon brake block W. Hendrick 161,034
Wagon seat fastening, C. Dixon 161,104
Wagon, side bar, E. Soper 161,172
Wall protector and towel rack, M. G. Pell 160,998
Washing machine, G. W. Mikesell 161,143
Washing machine, T. J. Webster 161,186
Watch key, A. and C. A. Wanner 161,306
Watch plate, F. A. Lange 161,244
Watch, stem setting, J. F. U. Jürgensen 161,239
Watch, stem winding, C. S. Mosely 161,262
Watches, mainspring for, G. Hunter 161,236
Water closet, H. P. Buchan 161,004
Watercock, self-closing, J. B. Tougas 161,077
Water power, C. Monson 161,146
Water wheel governor, etc., F. G. Hesse 161,035
Water wheel governor, A. Woodworth 161,084
Weighing apparatus, A. B. Davis (r) 6,346, 6,347
Well reamer, W. Young 161,190
Windows, dust trap for bulk, S. A. Wright 161,312
Wire stand, J. H. Bigelow 161,199
Wood, embossing, W. Sochersky 161,290
Wrench, G. W. Freeman 161,022

EXTENSION GRANTED

28,470.—SLIVER MACHINES.—C. C. Grant.

DESIGNS PATENTED.

8,211.—STATUE.—D. Barselotti *et al.*, New York city.
8,212.—ALTO RELIEVO.—J. Christl, Newark, N. J.
8,213, 8,214.—CASTS.—J. W. Fiske, New York city.
8,215.—VASE.—W. L. Libbey, Boston, Mass.
8,216.—CARPETS.—S. McDowell, Philadelphia, Pa.
8,217.—STAIR RODS.—W. F. Mersereau, Orange, N. J.
8,218, 8,219.—CARPETS.—A. Redfern, Philadelphia, Pa.
8,220.—SALT CELLARS.—J. S. Atterbury, *et al.*, Pittsburgh, Pa.
8,221.—DISHES.—S. B. Close, New York city.
8,222.—CALL BELLS.—H. S. Kerr, Philadelphia, Pa.
8,223.—WALL BRACKET.—H. Peacock, Philadelphia, Pa.
8,224.—STOVE PLATES.—G. Smith *et al.*, Philadelphia, Pa.
8,225, 8,226.—ENVELOPES.—R. Sneider, Brooklyn, N. Y.
8,227.—BOTTLE.—F. Storm, Philadelphia, Pa.
8,228.—SHIRT BORDER.—C. S. Vetter, Philadelphia, Pa.

TRADE MARKS REGISTERED.

2,302 to 2,304.—PLOWS.—Avery & Sons, Louisville, Ky.
2,305.—HAMS, ETC.—Evans Bros., Cincinnati, Ohio.
2,306.—SPRINGS, ETC.—Spring and Axle Works, Fort Plain, N. Y.
2,307, 2,308.—FIRE BRICKS.—Harrison *et al.*, Pittsburgh, Pa.
2,309.—BAKE POWDER.—Jewett & Co., Milwaukee, Wis.
2,310.—TOBACCO.—Pioneer Co., Brooklyn, N. Y.
2,311.—WOOLENS, ETC.—Washington Mills, Lawrence, Mass.
2,312.—PLOWS.—B. F. Avery & Sons, Louisville, Ky.
2,313.—DENTIFRICES.—C. Bullock, Cambridge, Mass.
2,314.—LARD, ETC.—Chesebrough *et al.*, Philadelphia, Pa.
2,315.—PAPER.—Keith Paper Co., Turner's Falls, Mass.
2,316.—CIGARS.—Kerbs & Spiess, New York city.
2,317.—RIBBONS.—Kiefer & Co., New York city.
2,318.—BEEF, ETC.—Whitney & Co., Lowell, Mass.

SCHEDULE OF PATENT FEES.

On each Caveat $10
On each Trade mark $25
On filing each application for a Patent (17 years) $15
On issuing each original Patent $20
On appeal to Examiners-in-Chief $10
On appeal to Commissioner of Patents $20
On application for Reissue $30
On filing a Disclaimer $10
On an application for Design (3½ years) $10
On application for Design (7 years) $15
On application for Design (14 years) $30

CANADIAN PATENTS.

LIST OF PATENTS GRANTED IN CANADA, MARCH 19 to 23, 1875.

4,513.—L. Heath, Boston, Mass., U. S. Shoe. March 19, 1875.
4,514.—T. B. Coursey, Spring Mills, Del., U. S. Turbine water wheel. March 19, 1875.
4,515.—W. C. North, Cleveland, Ohio, U. S. Ventilating faucet. March 20, 1875.
4,516.—J. Blow, Bowmanville, Ont. Fire kindler. March 20, 1875.
4,517.—W. Walker, Montreal, P. Q. Tubular lantern. March 20, 1875.
4,518.—B. P. Aylsworth, Picton, Ont. Buggy body. March 20, 1875.
4,519.—B. F. Sturtevant, Boston, Mass., U. S. Compressing boot peg ribbon. March 20, 1875.
4,520.—B. F. Sturtevant, Boston, Mass., U. S. Fastening for boots. March 20, 1875.
4,521.—J. L. Kerr, Allegheny, Pa., U. S. Gun. March 20, 1875.
4,522.—O. Jenness, Alton, N. H., U. S. Vehicle spring. March 20, 1875.
4,523.—T. Linklater, Belleville, Ont. Eaves trough. March 20, 1875.
4,524.—C. W. Volney, Brockville, Ont. Explosive powder. March 20, 1875.
4,525.—G. Seger *et al.*, Humberstone, Ont. Force pump. March 22, 1875.
4,526.—E. C. Ibbotson, Chelsea, Mass., U. S. Railway joint. March 22, 1875.
4,527.—D. L. Toppan, Somerville, Mass., U. S., *et al.* Wood planing machine. March 22, 1875.
4,528.—E. Cliff, Pickering, Ont. Rein holder. March 22, 1875.
4,529.—J. N. Edy, Brantford, Ont. Motive power. March 22, 1875.
4,530.—A. Cant, Galt, Ont. Wood planing machine. March 23, 1875.
4,531.—A. A. Pope, Boston, Mass., U. S. Air gun and pistol. March 23, 1875.
4,532.—D. Allard, St. Albans, Vt., U. S. Smoke stack. March 23, 1875.
4,533.—J. McElroy, Arkona, Ont. Table-leaf support. March 23, 1875.
534.—M. Bird, London, England. Waterproofing leather. March 23, 1875.
4,535.—G. S. Walker, Erie, Pa., U. S. Clothes wringer. March 23, 1875.