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For best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay, Brooklyn, N. Y.



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 % inch, and the eye glass to 1/4 inch diameter." А. If a lens is bad, the edge zones are cut off by a stop or diaphragm. 2. What would be the power of 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 planoconvex 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 evenieces.

(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 11/2 inches apart, constituting the eyepiece. 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 31/2 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.

nerside 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 wash ing 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  $\frac{7}{8}$  lapon the slide valve **%** on one end, or is it **%** on one and <del>1</del>8 at the other? A. On one end. 2. What is meantby 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 cer tain 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 ressure. Is he right? A. No.

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

(12) L. R. B. asks: 1. What power, as usual ly 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 powerrequired can be reduced consid erably if less work is done by the machines. 3. What is commonly used to thin printer'sink? A Soap is very often employed.

(13) T. McK. says: I have a small camera bscura 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 differ ence between a landscape and portrait combina-tion, and, if so, whatis 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 (15) R. H. S. says: 1. Please say what par-

(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 seve ral 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 salammoniac 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  $% \left( f_{1}, f_{2}, f_{3}, f$ 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 iceprisms which float, up to an inch in diameter, in summer air currents, above 1/2 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.

A lso 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 patentab'lityof 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 sew-ing 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 Perwhich is specially set apart for that pursonal," pose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

## [OFFICIAL.]

# INDEX OF INVENTIONS FOR WHICH

Letters Patent of the United States were

Granted in the Week ending March 23, 1875.

AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

Air, compressing, H. J. Bailey	161,090
Amalgamator, J. Rutherford	161,160
Ammonia, manufacturing, F. M. Lyte	161,137
Ash can receptacle, L. F. Winter	161,316

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ticular 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 fint 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 eve

piece. 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 term for a unit of work, in a minute, equivalent years, on every Saturday evening turned the in- to 33,000 foot pounds in that time.

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 indiameter 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

Ash can receptacle, L. F. Winter 161,316
Atomizer, C. P. Janes (r) 6,345
Awning, window, A. W. Redgrove 161,274
Bag fastener, J. A. Danielson 161 209
Bale tie, R. Terrell
Barrel making machine, J. Martin 161,251
Basins, setting, J. Stevenson 161,291
Battery, galvanic, J. Leiter 161,246
Bed bug trap, J. L. Hawkins 161,032
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Book rest, R. S. Grummon 161,026
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Boots, crimping leather for, C. B. Long 161,247
Bottle filler and corker, G. H. Ferry 161,107
Box scraper, A. W. Tuckerman 161,181
Bronze liquid, R. C. Ochmler