



E. S., of Pa.—The best way to grind a slide valve is to scrape it, which is to say that it must not be ground. The grinding material gets in the pores of the metal and in the ports of the cylinder, and cannot be got out. In this way it soon destroys the piston packing and cylinder. Take a three square file and grind it sharp on the edges, and you will have a good scraper. To grind a poppet valve or a safety valve scrape it until it bears well all over, and then take a little pulverised pumice-stone and water or grind-stone, slush and cut down the high points.

L. W., of Mass.—\$24 20 received. We are very greatly obliged for the substantial token of your appreciation which you send us in the shape of so large a list of subscribers. For the kind words of interest and encouragement which you so well express, you have our thanks. We shall in due time give attention to your suggestions. We do not remember any patent for the idea of revolving the wheels of a clock calendar by gravitation? But perhaps we do not fully understand your inquiry. Do you mean a self-operating mechanism, *i. e.*, a perpetual motion?

R. C. B., of Ill.—When the atmosphere rests on all parts of the surface of any vessel or pond of water, it has no tendency to raise any portion of the water. But if one end of a tube is placed in the water, and the air in the tube is taken out, so as to remove the pressure from that portion of the surface enclosed in the tube, then the weight of the atmosphere resting on the surface outside forces the water up into the tube. In the case of a pump the air in the tube is raised from off the surface of the water by the piston. If capillary attraction is due to atmospheric pressure, how is the pressure of the air taken from the surface of the liquid within the capillary tube?

W. H. W., of Conn.—To procure hydrogen gas, dilute 3 pounds of oil of vitriol with 24 pounds of water, and dissolve in it 2 pounds of zinc. All the apparatus required is an air-tight glass or lead vessel, with a pipe inserted air-tight in the top to carry off the gas. Navigating balloons will always be impracticable, for the reason that a balloon which will float an engine in the air must be too bulky to be moved with any but the most moderate velocity through the air. Fire shells have long been made far more efficient than Greek fire, or any other liquid.

H. W. S., of Ohio.—This correspondent says:—"On page 163 you have an account of a submarine boat building in England for Russia. I would ask when a vessel is sunk completely under water what means can be used to vary its buoyancy so minutely as to keep it at any particular distance between the surface of the water and the bottom of the river or ocean. It seems to me that a variation of so little as one ounce in a thousand pounds would sink or float it." We answer by taking in or expelling water.

W. B. A., of N. Y.—We are very much obliged to you for the formulæ you send to obtain the lengths of belts, but does it not strike you that in practice a mechanic could find the length quite as soon with a tape-line. So long as the distance between the centers has to be measured before the calculation is made, we might as well make one thing of it and find the actual length of the belt at the same time. We shall be glad to hear from you again.

E. R. C., of N. J.—Hilton's cement will fasten the metal bottom into your porcelain cup provided you do not wish to expose it to the action of heat. If it is to be exposed to heat you may use boiler-makers cement. This is made by mixing with white lead ground in oil as you buy it at the paint shops, red lead so as to make a paste like dough. It will harden in two weeks. Use only just enough for the purpose.

C. P. R., of Ill.—Your criticism of the item "A crossed belt will drive more than a straight belt, because it hugs the pulley tighter," is perfectly correct. A crossed belt drives more than a straight belt, because it laps further round the pulley, and that is the interpretation which every intelligent mechanic would put upon the two lines in question. It is proper to be exact in all expressions, but terms are synonymous sometimes, in this case particularly.

C. T., of N. Y.—You can get a small quantity of magnesium wire for experiment of Professor Seely, 244 Canal street, this city, at fifty cents per foot. It may be set on fire with a match, when it burns rapidly with an exceedingly bright and beautiful flame. The product is of course magnesia, the oxide of magnesium.

W. J., of Pa.—In making varnish the gum is melted then hot linseed oil is poured in, and finally benzine is added. Petroleum benzine is a very poor solvent of the gums used in making varnish and is apt to separate, but the coal tar benzine is nearly as good as spirits of turpentine.

J. McN., of C. W.—Hatfield's "American House Carpenter," published by John Wiley of this city in 1857, is a good work for you to have. We notice your remark about the Canadian patent law policy, and we sincerely hope that something may yet be done to secure such an amendment as will admit our citizens to equal protection.

W. J. C., of La.—There is no rule for finding the length of the link. It is simply an agent for connecting the two eccentric rods together, and an inch more or less makes no difference in its operation. It is made as light and as strong as possible, on account of the trouble of counterbalancing it.

A. T. D., of Maine.—Your plan of generating steam by throwing just enough water into a boiler or pipe for the capacity of the cylinder is very old. Paine's "Spray engine" was thus operated. There is no economy in it, and the heater or boiler if you choose to call it such, is destroyed quickly.

J. H. H., of Mass.—There are so many good breech-loading rifles using metallic cartridges that it would be difficult to decide which one is the best. Look over the engravings of such devices the SCIENTIFIC AMERICAN, and make your own selection.

G. B. P., of N. Y.—We are glad you are so highly pleased with the manner in which we have executed your patent business. You can get information as to metallic packing at any of the engine builders in your place.

T. C. B., of Conn.—An interesting illustrated article on die-sinking and multiplying will soon be published, and we refer you to it for the information you desire respecting this art.

P. M., of R. I.—Coccolus Indicus is used to destroy or stupify fishes so that they can be taken with little trouble and in large quantities.

C. B. M., of N. J.—The difference between a cross-cut saw and a rip saw is that the teeth of the latter all lead one way, while those of the former are straight up and down, the first are equilateral triangles, while the latter are right-angled triangles.

J. R. W., of Mass.—There is a great difference in the efficiency of levers. In a first class lever the power moves faster than the work, which is a mechanical advantage. In the third class lever the work moves faster than the power, which is a disadvantage.

E. B. C., of Ohio.—We know of no journal devoted exclusively to telegraphing. The SCIENTIFIC AMERICAN aims to have everything new and interesting relating to the subject. We illustrate and describe all valuable improvements in any of the apparatus.

W. P. B., of Wis.—Morse & Bros., of Athol, Mass., were at one time engaged in making furnaces for burning wet tan bark. You had better address them on the subject.

O. H. D., of Maine.—We shall be most happy to read your article on dry printing, and the results of your experience with the machinery in the treasury department.

J. S. Cummings, of Webster, Mass., wants to know if machinery suitable for the manufacture of linen thread can be procured in this country.

C. A. C., of Ind.—We are preparing a series of illustrated articles on the subject of lathe tools, which will appear in a short time.

C. M. R., of Va.—You can obtain galvanic batteries and all the information you desire of Messrs. Chester, 404 Center street, New York.

W. A. F., of Vt.—Address M. J. Chaff, No. 238 Washington street, Boston, Mass., in relation to clothes wringers.

T. B., of Ohio.—Knife blades can be fastened by a cement composed of shellac two parts, chalk one part. The hole in the handle is filled with this powder, the tane heated, pushed in and left standing on end.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Sept. 14, 1864, to Wednesday, Sept. 21, 1864:—

- C. A. H., of N. Y., \$25; G. F. J. C., of N. J., \$25; H. M., of N. Y., \$20; F. & H., of N. Y., \$120; J. McK., of N. Y., \$45; W. G., of N. J., \$20; W. B., of Ind., \$20; A. M. O., of Ill., \$75; S. W. P., of Ill., \$20; B. M., of N. Y., \$20; W. T., of N. Y., \$35; D. H. B. A., of Vt., \$20; C. & T., of Conn., \$25; A. J. N., of R. I., \$15; F. C. W., of Conn., \$25; J. G., of Pa., \$20; T. K., of Conn., \$16; B. L. W., of Ill., \$20; R. McC., of Ill., \$15; J. S. W., of C. W., \$36; T. N. D., of Ind., \$35; W. N., of N. Y., \$15; D. R., of Mich., \$20; W. T., of Ill., \$20; H. J. H., of N. Y., \$66; W. F. Q., of Del., \$20; J. A. McP., of N. Y., \$30; S. G. R., of N. Y., \$25; A. S. H., of N. Y., \$25; A. W. H., of N. Y., \$20; W. R. M., of N. Y., \$20; V. H. H., of N. Y., \$45; S. W., of Wis., \$20; J. E. T., of Pa., \$20; C. W. & J. P. W., of Ill., \$20; W. A. B., of Vt., \$56; J. N. C., of Ohio, \$20; A. P., of N. Y., \$45; W. J. L., of Mass., \$20; J. W. B., of Mass., \$12; I. C. P., of Ill., \$15; G. W. M., of Mich., \$25; H. F. W., of Mass., \$30; N. D. H., of Conn., \$30; S. C. T., of Mich., \$16; C. C. B., of Iowa, \$25; D. H. L., of Ill., \$15; M. C. D., of Ohio, \$15; G. F. M., of Ohio, \$16; P. W., of Mich., \$25; V. F., of Mass., \$15; W. B. M., of Mich., \$25; G. K. W., of Conn., \$30; J. H. F., of Ky., \$52; C. J. H., of N. Y., \$25; E. F. W., of N. Y., \$25; M. H., of N. J., \$40; F. G. S., of Mass., \$20; B. & A., of Cal., \$25; M. C., of Ohio, \$20; McI. & M., of Mich., \$20; J. B., of N. Y., \$20; J. H. L., of N. Y., \$40; T. B. G., of N. Y., \$50; W. H. F., of Pa., \$20; G. F., of Ill., \$16; A. P., of Wis., \$16; F. M. B., of Ky., \$20; J. S., of N. Y., \$16; A. R., of N. Y., \$787; G. W. B., of Ohio, \$25; J. H. M., of Ohio, \$16; J. & B., of N. Y., \$450; H. W., of Wis., \$35; O. B., of N. Y., \$16; J. G. S., of Mass., \$16; F. H. B., of Ill., \$15; E. C., of N. Y., \$25; L. M. H., of N. Y., \$25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Sept. 14, 1864, to Wednesday, Sept. 21, 1864:—

- G. F. J. C., of N. J.; S. G. R., of N. Y.; E. F. W., of N. Y.; W. A. B., of Vt.; A. E. B., of Conn.; W. B., of Ohio; B. L. W., of Ill.; T. N. D., of Ind.; H. W., of Wis.; C. C. B., of Iowa; G. K. W., of Conn.; J. H. F., of Ky. (2 cases); C. J. H., of N. Y.; C. A. H., of Pa.; M. H., of N. J.; J. H. L., of N. Y.; J. W. B., of Mass.; P. W., of Mich.; F. C. W., of Conn.; W. B. M., of Mich.; H. F. W., of Mass.; W. F. Q., of Del.; L. M. H., of N. Y.; H. J. H., of N. Y.; A. S. H., of N. Y.; A. M. O., of Ill.; T. B. G., of N. Y.; G. W. M., of Mich.; C. & T., of Conn.; M. C. D., of Ohio; E. C., of N. Y.; J. McP., of N. Y.; G. C., of N. Y.

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- To find the Radius of a Circular Railroad Curve, when the Plan or Map is inaccurate, and the Tangents cannot be prolonged to meet on account of obstruction.
- Principle Properties of the Circle, its Tangents and Chords, that relate to Railroad Engineering.
- To lay out a Railroad Curve by Angles of Deflection.
- To lay out a Railroad Curve by the Chain only.
- Rational Right-angled Triangles.
- To lay out a Railroad Curve by Baker's First Method.
- To lay out a Railroad Curve by Ordinates or Offsets from its Tangents.
- When the Railroad Curve is less than one-quarter of its Radius.
- When the Curve is of any given length.
- To lay off an Angle of Degrees, etc., on the ground with the Chain only.
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- To lay out a Railroad Curve by two Theodolites when obstructions prevent the use of the Chain.
- To lay out a Railroad Curve by means of Ordinates or Offsets from the Chord or Chords.
- Compound Curves.
- To find the Radii to connect two straight lines of Railroad; the road has to pass through given points.
- To lay out a Railroad Curve by means of Ordinates or Offsets in rational whole numbers.
- Radii of Curves of 1', 2', 10'.
- One of the two Radii of the Compound Curve, and its starting and closing points being given, to find the other Radius.
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