

## THE ZIRCON LIGHT.

We have lately examined this excellent improvement, as applied to the passenger car of the Beach Pneumatic Transit Co. The car, in size, is about the same as an ordinary street car, and a single zircon light illuminates its interior with brilliancy. Two small cylinders of compressed oxygen and hydrogen are carried on the car, from which pipes extend to a small burner that supports a piece of zircon, not more than  $\frac{1}{4}$  of an inch long and  $\frac{1}{8}$  of an inch in diameter. Against this little pencil of zircon the two gases impinge, and heat it so intensely as to make it glow with a clear and steady light.

Those who fancy that underground railway riding in New York is likely to be a dark and dismal affair will receive new impressions on the subject when they enter the premises connected with the Broadway tunnel.

One of the great advantages of the zircon light is that it burns like any other light without requiring adjustment. The light carried on the car before mentioned, burns steadily for 7 hours without being touched. The zircon pencil lasts for three months, and is, in effect, the wick of the light. Information concerning the zircon light can be had of the New York Oxygen Gas Company, corner of Eleventh avenue and Forty-first street, New York city.

## Action of Magnetism on Various Gases.

M. Treve has communicated to the French Academy some remarkable results of experiments upon the action of magnetism upon the various gases. When the spark from an induction coil passes through a Geissler tube filled with hydrogen the gas becomes luminous, having a blue tint, plainly violet at the extremities of the tube, and of a fine red color in a capillary prolongation. But upon placing the latter part of the apparatus between the poles of a magnet the red instantly disappeared, giving place to a perfectly white light. In like manner oxygen, which gives a milky white light in the capillary tube, became red; nitrogen deepened its blue to a still deeper blue; the brilliant white of carbonic acid became deep blue; the blue of silicium fluoride became a bluish violet. The spectra of these luminous tubes changed when the capillary portions were subjected to the action of magnetism.

**BOILER EXPLOSIONS.**—From the report of the Manchester Steam Users' Association it appears that there were fifty-eight boiler explosions in England during 1869, by which eighty-six persons were killed and one hundred and twenty-six injured. The greatest number of explosions took place at collieries. The boilers from which most of the disasters resulted are described as plain cylindrical, egg-ended, camber-ended, and flat-ended (externally fired). The causes of the explosions are stated to be, first, malconstruction giving twenty-six cases; second, defective condition giving fifteen cases; third, over-heating giving nine cases. The nature of the remaining eight cases had not been ascertained.

**TIN IN CALIFORNIA.**—The Chief of the Cabinet of Practical Geology and Mining of the United States General Land Office, has very recently written a letter, stating that additional information in reference to the discoveries of tin in San Jacinto, San Bernadino county, Cal., has been received, and specimens of the ore have arrived. The analysis of an average specimen by a competent chemist and mineralogist shows that the ore contains 13.37 per cent of pure tin. The ore is intermixed with tourmaline, containing boracic acid, and with cassiterite. This combination is reported to be unusual and highly interesting, and the yield of tin is double that of the ores at the Cornwall (England) mines.

## Answers to Correspondents.

**CORRESPONDENTS** who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address correspondents by mail.

**SPECIAL NOTE.**—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal." All reference to back numbers should be by volume and page.

L. H., & Sou., N. Y.—We know of no lacquer used for finishing sadrons. We think you can get the finish you speak of, or at least one equal to the sadron finish thus: See that your buff wheels are well balanced after they are covered. Let the wheel be covered with thick leather before covering with the emery. Get as good a surface on the article as you can from a wheel covered with No. 70 emery. Mix flour of emery with melted beeswax and stir in till it is thick. When the mass is cool rub it on a new covered wheel with No. 80 emery. Then set the wheel running, and hold on a flint to smooth it until the surface is sufficiently fine to suit.

W. McC., of Iowa.—Under the circumstances we do not think there will be a sufficient saving between a non-condensing and a condensing engine to pay first cost of condensing apparatus, extra skill in management, and extra cost of repairs. The quantity of water required to condense, say at 60 degrees, will be 9,375 gallons per hour, but to provide for waste, say 10,000 gallons. We know of no better mode to cool the water than to expose it to the open air in a series of shallow tanks arranged like the steps of a stairway, so that the water may fall in a thin sheet from one to another.

C. M., of Mass.—You need not fear that water, in passing from a slate roof to your cistern through zinc gutters and pipes will be contaminated. You may test the presence or absence of zinc by adding to a small quantity two or three drops of hydrochloric acid, and then adding carbonate of soda in solution. If zinc be present a white precipitate will be formed.

S. T. T., of Md.—Any solid substance which will begin to sink in water, will sink, if unobstructed, to the bottom. The reason is this. Any solid now known is more compressible than water. Compressing it increases its specific gravity and renders it less buoyant than before the pressure was put upon it. As it goes down then its tendency to sink is increased rather than diminished.

V. C., of Wis.—To make a blue paint for a drum, you may use a shellac varnish and color to the tint desired.

A. B.—We have no doubt a wall made of sand, gravel, small stones, and good water lime cement, will make a good wall for a barn cellar, if good water lime is used and the work properly done.

X. Y. Z., of N. B.—The pressure per square inch of water upon the sides of vessels, is as the height of the column, not as the diameter.

B. & W., of N. H.—You will find the information you desire in an article published in another column.

E. C., of O.—When the lime is precipitated from a solution of chloride of lime, the solution will no longer be chloride of lime. You can make a clear solution of chloride of lime by filtering.

J. A. V., of Ind.—We think you will find all the information you seek in "Practical Treatise on Heat" by Box. Published by Henry Carey Baird, 406 Walnut street, Philadelphia, Pa.

H. De L., of Pa.—A constant temperature is better for any kind of distillation than a fitful and varying one, if maintained at the proper point.

J. Slack.—To make chloride of gold, dissolve the gold in three times its weight of nitro-hydrochloric acid (aqua regia) and evaporate nearly to dryness. The salt can be made more neutral by repeated crystallizations and washings.

N. W. West.—Hand saws are made of steel plate of the right thickness. The teeth are cut in a suitable machine. We shall probably give a description of the hardening process in a subsequent issue. Your third inquiry cannot be answered in brief. You will find the subject discussed at length in works on metallurgy.

E. G. S., of N. B.—You will find a rule for computing the mean pressure in steam cylinders, in "Bacon's Richard's Steam Engine Indicator," published by D. Van Nostrand, 23 Murray street, New York. You do not give sufficient data; you have omitted to mention the clearance.

J. L. C.—For plumbing work in dwellings, except for water intended for drinking, we should prefer the seamless brass or copper tubes to any other. For pipes intended to convey water for culinary and drinking purposes, we prefer block-tin lined lead pipes.

## Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

**Millstone Dressing Diamond Machine**—Simple, effective, durable. For description of the above see Scientific American, Nov. 27th, 1869. Also, Glazier's Diamonds. John Dickinson, 64 Nassau st., N. Y.

"Winn's Portable Steam Brick Machine," makes more and better brick than any other machine in the world. Address Wright & Winn, Lock Haven, Pa.

**Parallel Vise.**—The most durable, labor-saving, and strongest, with the firmest hold. A. P. & M. Stephens & Co., 91 Liberty st., New York.

**Perforated Zinc and Sheet Iron** for separators, smut machines, grain dryers, tubular wells, malt kilns, etc. R. Aitchison & Co., Chicago.

T. F. Randolph, Steam Model Works, Cincinnati, Ohio.

**Excelsior Turbine Water Wheel.**—This superior water wheel has been found, by a final test, to excel nearly one third, the best wheel in this country. For cheapness, durability, and power, it can not be equaled. Full particulars given by circular. Address Isaac S. Roland, Reading, Pa.

**Foreman Wanted.**—One who understands molding all kinds of heavy machinery, and a temperate man, can find constant employment by applying to Murray, Moore & Co., Portsmouth, Ohio.

**Bone Mill Wanted.**—Address Oil Company, Columbia, S. C.

**Peck's patent drop press.** For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Ct.

**For the Best Upright Drill in the World,** address Wm. M. Hawes & Co., Fall River, Mass.

**Wanted.**—The address of manufacturers of power hub cupping machines, and wheel boxing machines. J. Bodley & Sons, wagon makers, Wheeling, W. Va.

**Scientific American**—Back Nos. and Vols., for sale. Address Theo. Tusch, No. 37 Park Row, New York.

The paper that meets the eye of manufacturers throughout the United States—Boston Bulletin, \$4.00 a year. Advertisements 17c. a line

For mining, wrecking, pumping, drainage, and irrigating machinery, see advertisement of Andrews' Patents in another column.

**To Rent.**—East River water front, stores and vacant lots suitable for manufacturing or mercantile purposes, together or separate Daniel W. Richards & Co., 32 Mangin st.

A half interest in the new and very valuable patent, Shackleton's System of Utilizing Exhaust Steam, for sale on reasonable terms. We give a few testimonials where it has been in use for some months. Moore & Sealy Brothers; Yates, Wharton & Co.; P. W. Vail & Co.; M. Gould & Son, Newark, N. J. Perth Amboy Fibre Co., 40 Broadway, N. Y. Tweedy & Co., and Randle & White, Danbury, Conn. Crane, Tubbs & Co.; A. T. Lum, and J. Y. Brokaw, Elizabeth, N. J., etc., etc., etc. The above save from 35 to 50 per cent. For particulars apply to A. Carr, 45 Cortlandt st., N. Y., or address P. O. Box 19, Elizabeth, N. J.

**Portable Pumping or Hoisting Machinery to Hire for Coffer Dams, Wells, Sewers, etc.** Wm. D. Andrews & Bro., 414 Water st., N. Y.

**Two 60-Horse Locomotive Boilers,** used 5 mos., \$1,300 each. The machinery of two 500-ton iron propellers, in good order, for sale by Wm. D. Andrews & Bro., 414 Water st., New York.

**American Boiler Powder**—A safe, sure, and cheap remedy for scale. Send for circular to Am. B. P. Co., P. O., Box 315, Pittsburgh, Pa.

For fire brick, fire clay, furnace tile, glass pots, stove linings, sewer pipe, drain tile, garden vases, pedestals, hydraulic cement, plaster of Paris, etc. Address D. R. Ecker, No. 13 Smithfield st., Pittsburgh, Pa.

See advertisement of Thomas' Lathes in another column.

**Cold Rolled**—Shafting, piston rods, pump rods, Collins pat. double compression couplings, manufactured by Jones & Laughlins, Pittsburgh, Pa.

**Keuffel & Esser,** 71 Nassau st., N. Y., the best place to get 1st-class Drawing Materials, Swiss Instruments, and Rubber Triangles and Curves

For tinners' tools, presses, etc., apply to Mays & Bliss, Brooklyn, N. Y.

**Glynn's Anti-Incrustator for Steam Boiler**—The only reliable preventative. No foaming, and does not attack metals of boiler. Liberal terms to Agents. C. D. Fredricks, 537 Broadway, New York.

**Machinists, boiler makers, tanners, and workers of sheet metals** read advertisement of the Parker Power Presses.

To ascertain where there will be a demand for new machinery or manufacturers' supplies read Boston Commercial Bulletin's manufacturing news of the United States. Terms \$4.00 a year.

## U. S. Patent Office.

## How to Obtain Letters Patent

FOR  
NEW INVENTIONS.

## Information about Caveats, Extensions, Interferences, Designs, Trade Marks; also, Foreign Patents.

For a period of nearly twenty-five years, MUNN & CO. have occupied the position of leading Solicitors of American and European Patents, and during this extended experience of nearly a quarter of a century, they have examined not less than fifty thousand alleged new inventions, and have prosecuted upward of thirty thousand applications for patents, and, in addition to this, they have made, at the Patent Office, over twenty thousand preliminary examinations into the novelty of inventions, with a careful report on the same.

The important advantages of MUNN & CO.'S Agency are, that their practice has been ten-fold greater than that of any other Agency in existence, with the additional advantage of having the assistance of the best professional skill in every department, and a Branch Office at Washington, which watches and supervises, when necessary, cases as they pass through official examination.

## CONSULTATIONS AND OPINIONS FREE.

Those who have made inventions and desire a consultation are cordially invited to advise with MUNN & CO. who will be happy to see them in person at the office, or to advise them by letter. In all cases, they may expect an HONEST OPINION. For such consultations, opinion, and advice, NO CHARGE is made. A pen-and-ink sketch and a description of the invention should be sent.

## TO APPLY FOR A PATENT,

A model must be furnished, not over a foot in any dimension. Send model to MUNN & CO., 37 Park Row, New York, by express, charges paid, also, a description of the improvement, and remit \$16 to cover first Government fee, and revenue and postage stamps.

The model should be neatly made, of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show with clearness the nature and operation of the improvement.

## PRELIMINARY EXAMINATION

Is made into the patentability of an invention by persons search at the Patent Office, among the models of the patents pertaining to the class to which the improvement relates. For this special search, and a report in writing, a fee of \$5 is charged. This search is made by a corps of examiners of long experience.

Inventors who employ us are not required to incur the cost of a preliminary examination. But it is advised in doubtful cases.

## COST OF APPLICATIONS.

When the model is received, and first Government fee paid, the drawings and specification are carefully prepared and forwarded to the applicant for his signature and oath, at which time the agency fee is called for. This fee is generally not over \$25. The cases are exceptionally complex if a higher fee than \$25 is called for, and, upon the return of the papers, they are filed at the Patent Office to await Official examination. If the case should be rejected for any cause, or objections made to a claim, the reasons are inquired into and communicated to the applicant, with sketches and explanations of the references; and should it appear that the reasons given are insufficient, the claims are prosecuted immediately, and the rejection set aside, and usually **Without Extra Charge to the Applicant.**

MUNN & CO. are determined to place within the reach of those who can find to them their business, the best facilities and the highest professional skill and experience.

The only cases of this character, in which MUNN & CO. expect an extra fee, are those wherein appeals are taken from the decision of the Examiner after a second rejection; and MUNN & CO. wish to state very distinctly, that they have but few cases which can not be settled without the necessity of an appeal; and before an appeal is taken, in any case, the applicant is fully advised of all facts and charges, and no proceedings are had without his sanction; so that all inventors who employ MUNN & CO. know in advance what their applications and patents are to cost.

MUNN & CO. make no charge for prosecuting the rejected claims of their own clients before the Examiners and when their patents are granted, the invention is noticed editorially in the SCIENTIFIC AMERICAN.

## REJECTED CASES.

MUNN & CO. give very special attention to the examination and prosecution of rejected cases filed by inventors and other attorneys. In such cases a fee of \$5 is required for special examination and report, and in case of probable success by further prosecution, and the papers are found tolerably well prepared, MUNN & CO. will take up the case and endeavor to get it through for a reasonable fee, to be agreed upon in advance of prosecution.

## CAVEATS

Are desirable if an inventor is not fully prepared to apply for a Patent. Caveat affords protection, for one year, against the issue of a patent to another for the same invention. Caveat papers should be carefully prepared. The Government fee on filing a Caveat is \$10, and MUNN & CO.'s charges for preparing the necessary papers are usually from \$10 to \$12.

## REISSUES.

A patent when discovered to be defective, may be reissued by the surrender of the original patent, and the filing of amended papers. This proceeding should be taken with great care.

**DESIGNS, TRADE MARKS, AND COMPOSITIONS** Can be patented for a term of years, also, new medicines or medical compounds, and useful mixtures of all kinds. When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send a full statement of the ingredients, proportions, mode of preparation, uses, and merits.

## PATENTS CAN BE EXTENDED.

All patents issued prior to 1861, and now in force, may be extended for a period of seven years upon the presentation of proper testimony. The extended term of a patent is frequently of much greater value than the first term; but an application for an extension, to be successful, must be carefully prepared. MUNN & CO. have had a large experience in obtaining extensions, and are prepared to give reliable advice.

## INTERFERENCES

Between pending applications before the Commissioners are managed and testimony taken; also, Assignments, Agreements, and Licenses prepared. In fact, there is no branch of the Patent Business which MUNN & CO. are not fully prepared to undertake and manage with fidelity and dispatch.

## FOREIGN PATENTS.

American inventors should bear in mind that five Patents—American, English, French, Belgian, and Prussian—will secure an inventor exclusive monopoly to his discovery among ONE HUNDRED AND THIRTY MILLIONS of the most intelligent people in the world. The facilities of business and steam communication are such, that patents can be obtained abroad by our citizens almost as easily as at home. MUNN & CO. have prepared and taken a larger number of European Patents than any other American Agency. They have Agents of great experience in London, Paris, Berlin, and other Capitals.

A Pamphlet, containing a synopsis of the Foreign Patent Laws, sent free Address MUNN & CO., 37 Park Row, New York.