



**C. M. F., of Conn.**—The way to calculate the actual horse power of your engine, or any other, is to multiply the steam pressure in pounds per square inch into the area of piston in inches, and velocity of piston in feet per minute, and divide by 44,000. The result is the horse power. The power varies with the pressure of steam. You must take the average steam pressure during the stroke. More friction is involved in a large than a small engine, because the parts are more massive. The cylinder of an engine should always be sufficiently large to obtain the benefit arising from using a cut-off. We advise you to get an engine with a 3½-inch cylinder and 9-inch stroke, in preference to using a second cylinder, combined with your present engine of 2-inch bore and 5-inch stroke.

**D. E. B., of Pa.**—We cannot tell where you can obtain Dingler's *Polytechnic Journal* containing the receipt for making Prussian blue to which you refer. It is not republished in the English language, so far as we know.

**J. K., of Pa.**—The best cement known to us for fixing leather coverings on iron pulleys is made with gum shellac and india rubber, dissolved in rectified naphtha. The pulley should be heated to the temperature of the cement when the latter is applied. A temperature of about 150° Fah. will be sufficient, but we are not positive whether the cement will adhere while the leather endures.

**G. W. S., of Conn.**—A gun can be made weighing no more than 50 pounds, which will carry a few grape shot, and kill at a mile distant. We have recently examined a divided bullet, formed in three sections, and secured in a cloth cartridge that was fired from a secession rifle musket at the fight of Big Bethel. A convenient and portable steam apparatus, capable of being drawn by one horse, and cooking for a whole company, beside warming all their tents, would be a very desirable improvement we believe for camp life. The gun and incendiary shell which are represented in your sketch are new to us, but incendiary shells charged with phosphorated naphtha are well known, and were invented for burning ships and wood buildings.

**A. G. A., of Ind.**—In tempering mill picks the first object is to get the proper quality of steel, as all the tempering processes in the world cannot make a good pick of a poor piece of steel. Use the best cast steel only. Do not heat it above a cherry red for hammering, and then hammer the points till the grains of steel are driven compactly together, then file the ends sharp. Put the end in the fire and keep it therein until it acquires a low red heat, then take it out and dip it in cold water, when it will be found fit to work the best burr stones. Avoid raising the heat of the steel above a cherry red.

**H. B. F., of Ill.**—There is no published work on millwrighting which is up to the practice of the present day. If your supply of water on a fall of five feet is irregular, we believe that a good overshoot wheel is the best you can use. If well made, it will be found durable and well adapted for your flouring mill. On high falls, with a steady supply of water, we recommend a good turbine, as large overshoot wheels are very expensive.

**E. J. B., of Pa.**—The best way for you to use your old copper is to melt it with some zinc and convert it into brass for your journal boxes. Melt the copper in a crucible first, then add the zinc in small pieces, stir up until the whole becomes homogeneous, then run it into ingots. Babbit's metal is composed of 25 parts tin, 2 of antimony and 5 of copper. You may also use your old copper in making this alloy. Gum shellac varnish is the best we can recommend for coating patterns; by mixing a little red lead with it we think its quality is improved.

**C. S., of Pa.**—Dr. Gesner's work on coal oil, published by Balliere Bros., 440 Broadway, this city, contains information respecting the refining of coal oils. A variety of chemical processes are practiced by different refiners of such oils.

**J. W. P., of England.**—We do not know the address of Charles McBurney. A letter will probably reach him if you address it to the care of the Boston Belting Company, Boston, Mass.

**O. R. H., of Wis.**—We do not remember the apparatus to which you refer. Mr. J. D. Prindle, of East Bethany, N. Y., obtained a patent through this office not long ago for the best boiler for cooking food for cattle we have ever seen. Address him, as above, for information.

**S. H. F., of Canada.**—We think it would be of great advantage to Mr. A. to advertise his coal oils in our journal. It cannot be expected of us to give space for gratuitous advertising.

**N. D., of N. Y.**—We are always glad to receive contributions for our paper, and are much obliged for the one you have sent us, but its publication would do you no credit whatever. We want sound practical ideas. No matter if they are rudely stated, we can put them into proper shape for publication. Mere vague theories are of very little account at this time.

**Z. K., of Mass.**—A patent was obtained by B. Wood, of Nashville, Tenn., on March 20, 1860, for a very fusible alloy, composed of lead, cadmium and tin.

**A. J. S., of Pa.**—We do not know the address of Mr. Coon. You had better address him at the place given in the list of Patents.

**G. A. S., of N. Y.** asks the following questions:—I have a deed of a patent right for Oneida county, and gave, in consideration, a contract agreeing to pay a certain amount on each machine sold. Now, if a man who owns the right for another county wishes to purchase machines of me, to sell in his territory, would I be obliged to pay the commission on machines sold to him? Ans.—Yes. The intention of the purchaser has nothing at all to do with your contract. If I sell a machine to a man who lives in this county, and then after a time moves away to another county, would he have full right to use it there? Ans.—No. He must get the consent of the owner of the county to which he moves before he can lawfully use the invention there.

**J. A. C., of C. W.**—Your induced current might be stronger than the primary; still on the removal of the battery, all of the currents would cease. A caveat is not received at our Patent office except from American citizens.

#### Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Nov. 13, 1861:—

J. F. Q., of Del., \$20; C. E. P., of Wis., \$20; A. S. D., of N. Y., \$20; J. M., of N. Y., \$20; J. M. M., of N. Y., \$20; C. H. A., of Conn., \$20; B. D. P., of Pa., \$20; W. H. A., of Conn., \$20; W. R. S., of N. Y., \$15; J. P., of N. Y., \$15; I. C., of N. Y., \$15; E. D. L., of R. I., \$25; S. H., of Conn., \$25; W. W. F., of Iowa, \$25; H. M., of N. Y., \$25; H. R., of Ill., \$15; W. J. S., of Ohio, \$15; O. M. T., of N. Y., \$25; S. J. S., of N. Y., \$15; A. G. B., of N. Y., \$10; W. O. H., of Pa., \$30; A. S. F., of N. Y., \$15; J. M., of Ill., \$15; S. & P., of Conn., \$60; O. E. M., of Ill., \$15; W. A. B., of Wis., \$25; H. & H., of Ill., \$15; B. T., of Ill., \$15; M. E. L., of N. Y., \$15; E. R., of N. Y., \$40; L. W. P., of Mass., \$25; J. B. D., of Conn., \$10; J. D. H., of Pa., \$15; A. S. K., of Mich., \$15; C. M., of N. Y., \$25; F. C. P., of N. Y., \$15; W. H. S., of Conn., \$15; S. S. W., of Pa., \$75; J. C., of Mass., \$15; T. J. B., of N. Y., \$15; T. & R., of N. Y., \$25; J. F. B., of Conn., \$15; J. R. A., of Pa., \$25; D. J. S., of N. Y., \$25; S. P. C., of Conn., \$20; A. B., of N. Y., \$25; T. F. L., of N. Y., \$25; S. S. W., of N. Y., \$25; N. A., of N. Y., \$40; M. & B., of N. Y., \$20; J. H. S., of N. J., \$20; R. G. H., of Mass., \$45; J. W. S., of N. Y., \$45.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Oct. 30, to Wednesday, Nov. 13, 1861:—

W. A. B., of Wis.; D. J. S., of N. Y.; H. W. M., of N. Y.; G. & Co., of Paris; E. & P., of N. J.; C. O. P., of Mass.; S. H., of Conn.; J. P., of N. Y.; O. M. T., of N. Y.; S. P. C., of Conn.; E. D. L., of R. I.; W. W. F., of Iowa; A. B., of N. J.; T. F. L., of N. Y.; T. & R., of N. Y.; S. & P., of Conn.; 2 (cases); C. M., of N. Y.; B. M. S., of N. J.; A. G. B., of N. Y.; K. & H., of Wis.; N. A., of N. Y.

#### TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

**BACK NUMBERS AND VOLUMES OF THE SCIENTIFIC AMERICAN.**—Volumes I, II, and III. (bound or unbound) may be had at this office ad from all periodical dealers. Price, bound, \$1.50 per volume, by mail, \$2.—which includes postage. Price in sheets, \$1. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding.

**BINDING.**—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express or delivered at the office, 40 cents.

#### RATES OF ADVERTISING.

**Thirty Cents per line for each and every insertion,** payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

#### THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

**INVENTORS AND CONSTRUCTORS OF NEW AND USEFUL CONTRIVANCES OR MACHINES,** of whatever kind, can have their inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good inventions or machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars, address—

**MUNN & CO.,**  
Publishers SCIENTIFIC AMERICAN,  
New York City

#### CHANGE IN THE PATENT LAWS.

#### PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 4th of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from \$30 down to \$15. Other changes in the fees are also made as follows:—

On filing each caveat.....	\$10
On filing each application for a Patent, except for a design.....	\$15
On issuing each original Patent.....	\$20
On appeal to Commissioner of Patents.....	\$20
On application for Re-issue.....	\$30
On application for Extension of Patent.....	\$50
On granting the Extension.....	\$50
On filing Disclaimer.....	\$10
On filing application for Design, three and a half years.....	\$10
On filing application for Design, seven years.....	\$15
On filing application for Design, fourteen years.....	\$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian

Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEENTH THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

#### Testimonials.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

**Messrs. MUNN & Co.**—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,  
**CHAR. MASON.**

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

**Messrs. MUNN & Co.**—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,  
Your obedient servant,  
**J. HOLT.**

**Messrs. MUNN & Co.**—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of Inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,  
Your obedient servant,  
**WM. D. BISHOP.**

#### Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of \$5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

#### How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fee by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

#### The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the acts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

#### Caveats.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a caveat, under the new law, is \$10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

#### Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

#### Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Anyone can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency...

Interferences.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents...

For further information, send for a copy of "Hints to Inventors," furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents...

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up...

Of all business connected with Patents, it is most important that extensions should be entrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office...

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property...

A GREAT STORY, BY A POPULAR AUTHOR.

Will be commenced ON THURSDAY NEXT, IN THE NEW YORK WEEKLY, the greatest story and sketch paper of the age...

THE SEXTON OF SAXONY; OR THE BRIDE'S BURIAL. From the pen of Francis S. Smith, author of "Evelyn Wilson," "Florence O'Neil," &c.

VALUABLE PATENTS FOR SALE.—WARRANTED fast colors of ANILINE, "Fuchsine," "Violet Imperial," "Bleu de Lyon," "Renard Freres & France."

COLORS FOR DYERS AND PRINTERS OF SILK Woolen and Cotton Goods.—The American Agency, for fast Aniline colors, manufactured exclusively by Renard Freres & France.

GUN BARREL ROLLS—GUN BARREL ROLLS.—Gun Barrel Manufacturers can be supplied with rolls for bending, welding and tapering gun barrels.

GOSSYPIUM ARBORIUM—PERENNIAL Cotton Tree. We have received a small consignment of this seed grown in the northern part of Peru.

PARTIES HAVING ARTICLES TO DISPOSE OF which, if sold in the United States, are liable to a patentee's claim, or subject to infringement of some patent, may learn of a foreign market by addressing Box 1,378 Post Office, Boston.

GUN FORGING.—PECK'S PATENT DROP PRESS, for gun and other forging. Manufactured by MILO PECK & CO., New Haven, Conn.

THE INTERNATIONAL EXHIBITION OF 1862.—THE want of a suitable and competent Agency, prepared to undertake the receiving, unpacking, fitting up and repacking of goods...

Impressed with these facts, and in compliance with the suggestions and wishes expressed to them by several of their continental and colonial friends, the undersigned have decided on establishing an International Agency in connection with the Exhibition of 1862...

1. Suitable offices and committee rooms, properly supplied with stationery, guide books and other works of reference, &c. 2. Storage premises for stowing away empty boxes, cases, &c.

3. Reception rooms, and all the conveniences of a home in connection with. 4. An old-established club house, in the very center of London...

The great and peculiar advantages of this part of the undertaking, which will be the result of the arrangements made, are:—The convenience and comfort of a private establishment open only to them and the members of the club, are self-evident...

21. A full programme of the arrangements, with the names of the principal members of the staff engaged, &c., has been published, and will be forwarded on application.

22. It is requested that all communications up to December 31st next, be addressed to Mr. W. V. Morgan, at 21 Bow-lane, London, E. C., after which date, at Round Church, London, W. C., as all preliminary arrangements will be fully carried out by that time.

23. The 1862 International Exhibition Agency will be placed under the GENERAL MANAGEMENT of our Mr. W. V. Morgan (Member of the Society of Arts and one of the guarantors of the exhibition fund)...

24. It is proposed not only to supplement the action of the Royal Commissioners in the business arrangements of the exhibition, but also to attend to other respects, such as negotiating sales, arranging for advertisements, and other aids to publicity...

25. The terms of subscription will be arranged for two classes of subscribers, viz:—1. Exhibitors who propose visiting England, and availing themselves of the services of the agency...

26. A full programme of the arrangements, with the names of the principal members of the staff engaged, &c., has been published, and will be forwarded on application.

27. It is requested that all communications up to December 31st next, be addressed to Mr. W. V. Morgan, at 21 Bow-lane, London, E. C., after which date, at Round Church, London, W. C., as all preliminary arrangements will be fully carried out by that time.

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31. The terms of subscription will be arranged for two classes of subscribers, viz:—1. Exhibitors who propose visiting England, and availing themselves of the services of the agency...

32. A full programme of the arrangements, with the names of the principal members of the staff engaged, &c., has been published, and will be forwarded on application.

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36. It is requested that all communications up to December 31st next, be addressed to Mr. W. V. Morgan, at 21 Bow-lane, London, E. C., after which date, at Round Church, London, W. C., as all preliminary arrangements will be fully carried out by that time.

37. The terms of subscription will be arranged for two classes of subscribers, viz:—1. Exhibitors who propose visiting England, and availing themselves of the services of the agency...

38. A full programme of the arrangements, with the names of the principal members of the staff engaged, &c., has been published, and will be forwarded on application.

39. It is requested that all communications up to December 31st next, be addressed to Mr. W. V. Morgan, at 21 Bow-lane, London, E. C., after which date, at Round Church, London, W. C., as all preliminary arrangements will be fully carried out by that time.

40. The terms of subscription will be arranged for two classes of subscribers, viz:—1. Exhibitors who propose visiting England, and availing themselves of the services of the agency...

NEW YORK OBSERVER FOR 1862.—IN ASKING the aid of all who may desire to extend the circulation of the New York Observer, it is proper for us to state distinctly the position it occupies with reference to the present condition of public affairs in our beloved country.

Having always maintained the duty of good citizens in all parts of the land to stand by the Constitution, in its spirit and letter, when that Constitution was assailed and its overthrow attempted, we accordingly at once gave a cordial support to the Government in its patriotic endeavor to assert its lawful authority over the whole land.

1. That the war was forced upon us by the unjustifiable rebellion of the seceding States. 2. That the Government, as the ordinance of God, must put down rebellion and uphold the Constitution in its integrity.

3. That the supply of men to support the Government under which he lives, in the struggle to reestablish its authority over the whole country. 4. That the Constitution of the United States is the supreme law of the Government as well as of the people...

The distinctive features of the Observer are:—1. It is printed on a double sheet, so as to make two complete newspapers, one devoted to secular and the other religious matters...

2. It gives every week a complete synopsis of the most interesting events in all the denominations, including those that are called Evangelical and those that are not; as every intelligent Christian wishes to be well informed respecting all of them.

3. It gives a well-digested epitome of the News of the Day, Foreign and Domestic, prepared with great labor and care, so that the reader is sure to be in possession of every event of interest and importance to the public.

The foreign correspondence of the Observer is unrivaled, and has long commanded the admiration of intelligent men. TERMS FOR NEW SUBSCRIBERS:—1. To each new subscriber paying in advance \$2 50 for one year, we will send the paper and a copy of our Bible Atlas, with five beautiful colored maps.

2. To the person obtaining subscribers we will give \$1 for each new subscriber paying \$2 50 in advance. 3. To any person now a subscriber sending us one new subscriber and \$4 we will send both papers for one year.

Specimen numbers of the New York Observer will be sent gratis to any address that may be forwarded to us for that purpose. The state of the country renders it important for us to send gratis for the churches, that a new and earnest effort be made to extend the principles of good government and sound religious truth into all the families of the land.

SIDNEY E. MORSE, Jr., & Co., Editors and Proprietors, 37 Park Row, New York.

SOLID EMERY VULCANITE.—WE ARE NOW MANUFACTURING wheels of this remarkable substance for cutting, grinding and polishing metals, that will outwear hundreds of the kind commonly used...

BRASS LIFT AND FORCE PUMPS, SHIP PUMPS, Steam Whistles, Gage Cocks, Oil Cups, and every variety Brass Work used by engine builders, manufactured by HAYDEN, BONDERS & CO., 84 Beekman street, New York.

GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the Improved Balance Wheel Pump, Duplex Vacuum and Steam Pump, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift.

PUMPS! PUMPS!! PUMPS!!!—CARY'S IMPROVED Rotary Force Pump, unrivaled for pumping hot or cold liquids. Manufactured and sold by GARY & BRAINERD, Broeklyn, N. Y. Also, sold by J. C. CARY, No. 2 Astor House, New York.

MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price.

ALBANY IRON WORKS, TROY, N. Y.—SEMI-STEEL Plates and Forgings.—We are prepared to furnish forged shapes of this approved metal, and without unnecessary delay, having large facilities for production.

CRUDE PARAFFINE WANTED.—FOR WHICH THE highest price will be paid for a good article well pressed. Address H. RYDER & CO., Patent Paraffine Candle Manufacturers, New Bedford, Mass.

HARRISON'S GRIST MILLS—20, 30, 36 AND 48 inches diameter, at \$100, \$200, \$300 and \$400, with all the modern improvements. Also, Portable and Stationary Steam Engines of all sizes, suitable for saw mills. Also, Bolters, Elevators, Belting, &c.

NONPAREIL WASHING MACHINE.—THIS MACHINE must take precedence of all other machines now in use, being the only one justly entitled to be considered as constructed on correct mechanical principles. Machines and State and county rights for sale by OAKLEY & KEATING, 73 South street, New York.

MESSIEURS LES INVENTEURS.—AVIS IMPORTANT. Les Inventeurs non familiers avec la langue Anglaise et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous adresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen.

Zur Beachtung zur deutsche Erfinder. Die Unterzeichneten haben eine Anstalt, die Erfindern das Verfaehen angibt, um sich ihre Patente zu sichern, herausgegeben, und verabsichten solche gratis an tieferleben. Erfinder, welche nicht mit der englische Sprache bekannt sind, koennen ihre Mittheilungen in der deutschen Sprache machen. Schreiben von Erfindungen mit kurzen, deutlich gezeichneten Bezeichnungen beliebe man zu adressiren an

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**Mr. Fairbairn on High Pressure Steam.**

At the opening of the Liverpool School of Science, Mr. Fairbairn said:—"As a laborer in the field of science, more particularly practical science, I am sure you will allow me to give you a few examples of the great advantages which the industrial arts receive from the exact sciences, and particularly from those constructions which are of much greater advantage to the industry and property of the community. With regard to steam I am quite sure every person here present, must be aware of the very great advantages of that source of power, that immense power we see daily before us; and if we look back to the days since James Watt lived, to the present time, everybody will be convinced of the great improvements that have taken place by the application of science to that particular element. I recollect well, in the early part of my own history, that the steam engine never worked above 7 lbs to 8 lbs upon the square inch; it then reached 20 lbs, then 50 lbs. But now if we look at the locomotive engine, the pressure is upwards of 150 lbs and even 200 lbs, upon the square inch. This is a great advantage, and if we may judge by the great improvements which are taking place with regard to the steam engine, the locomotive as well as the condensing engine, I am inclined to think that we are not by any means arrived at the full economy of the production of steam in this country and all other countries. Instead of working at the rate of 200 lbs upon the square inch, I think it is very likely that it will reach 500 lbs." Mr. Fairbairn said he would next allude to the application of iron to all the purposes of the industrial arts. That application was, he said, by no means limited, and it would continue to extend. He instanced the construction of the Conway and Britannia bridges in proof of the principle of construction by experimental research. He had every confidence that the institution which they had inaugurated would be highly productive, and prove of benefit to the people of Liverpool, and to the rising generation, and that it would add to our knowledge of science.

**Smoke House—How it Should be Built.**

A smoke house should be square, its size varying from four to eight feet in diameter, according to the quantity of meat required to be smoked; the lower portion to the height of five feet should be of brick,

better flavor from hard than from the soft woods, while the amount of creosote, which is the preservative property, will be the same.

**Improved Armor for Ships.**

On pages 266 and 267 of the current volume of the SCIENTIFIC AMERICAN we gave an illustration of J. F. Winslow's mode of constructing iron-plated ships and securing the armor upon their sides. We now present an illustration of an improvement upon the plan made by the same inventor, who claims, as one of the advantages of his principle of armor construction, that it admits of various modifications.

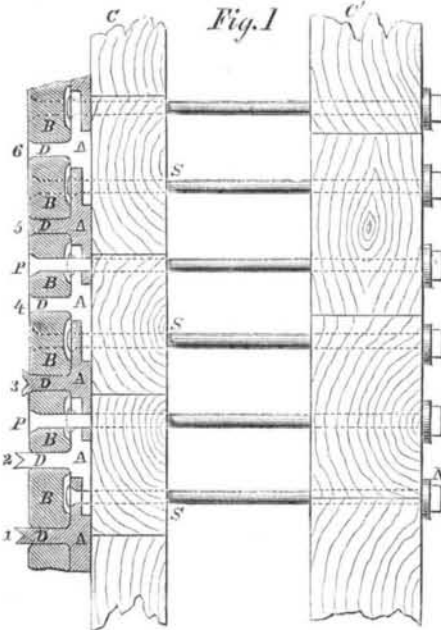
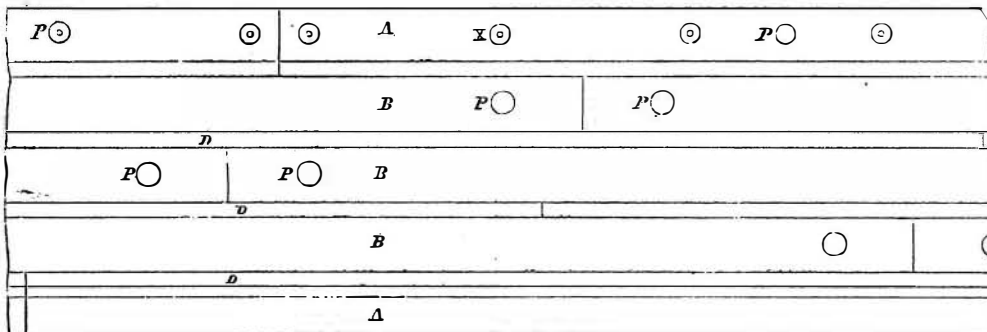


Fig. 1 represents a portion of the transverse section of the vessel, showing the armor attached. C C shows the internal and external planking of the vessel; A A A A A represent a series of rolled chairs from 12 to 20 feet long, and 5 inches broad. The form of these chairs, A, admits of their lapping and forming a continuous sheet next to the hull or sides of the vessel, of any desired thickness not exceeding 1 1/2 inches. The chairs are held together by spikes and the through bolts, S, which bolts, passing through

Fig. 2



**WINSLOW'S IMPROVED ARMOR FOR SHIPS.**

with a door lined with sheet iron. This part may serve both as an ashhouse and as the proper place for the fire to furnish the smoke. Fire should be placed in the middle and covered with the material to be burned, so that the mass, being surrounded by ashes, may maintain the ignition for a long time, giving off the smoke with regularity. The upper part may be wood, and the separation from the lower part by joists, covered with scantling, so as to leave spaces averaging three inches in diameter, for the ascent of the smoke. The height of this upper portion may be four feet, beside the ascent of the roof, and should be furnished with a door that may be locked, so that the door to the lower portion will not give ingress to the meat room. This separation between the two portions will catch any piece of meat which may accidentally fall, while the lower portion need not be locked, so as to enable the frequent removal of ashes from the house, and the proper attention to the fire to be more readily performed. Sawdust placed over a few ignited coals, will furnish the necessary material for smoking the meat. The sawdust, however, should be from such wood as is most free from resinous matter; the pyrogenous acid evaporated is of a

both parts or lapped part of the chairs, and through to the inside of the vessel, are then secured by nut and screw, N. These spikes and through bolts may be alternate or in any other relative position to meet the exigency. These chairs, A, are armed with a tongue, D, also a rolled portion of the chair; and between these tongues are placed the bars, B. The angles or sharp corners being removed in the process of rolling to form a countersink to be filled by setting over that portion of the tongue which protrudes beyond the plane, as shown respectively in the stages 1 2 3 and 4; 1 and 2 show the bar between two tongues, V-shaped at the end, also formed in the rollers; 3 shows the tongue flanged over and filling the countersink, and 4 5 and 6 show the finished stage. In addition to this rivetsecurement the bolts, P, are introduced every 6 or 7 lineal feet apart. These bolts pass through to the inside of the vessel and are secured with nut and screw, as shown.

Fig. 2 represents an external view of the armor when complete. The holes, X, represent the points through the chair, A, to receive the spikes and bolts, and P P represent the points to receive the countersunk bolts, P, (Fig. 1).

The object of having these narrow bars and chairs is to obviate the necessity of tonguing and grooving plates, and it will readily suggest itself that these narrow chairs and bars will accommodate their forms to the most difficult curves in the hull of a vessel, and in cases of repair can be removed at comparatively little cost.

This plan is as novel as it is ingenious and facile of attachment, and not least among its recommendations ranks economy of construction. Measures have been taken to secure it by Letters Patent.

In an address delivered recently before the Glasgow, (Scotland) Philosophical Society, Dr. Taylor suggested the use of the electric light for coal mines, so as to avoid the danger of explosion from fire damp with miners' common lamps. He proposed that the light be contained in sealed glass tubes hung from the roof of the mine, and that the current should be obtained from a Ruhmkorff coil.



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