



**PATENTS**  
GRANTED  
FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for new inventions in the United States and in all foreign countries during the past seventeen years. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after seventeen years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of 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,  
CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

Messrs. MUNN & Co.—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as 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.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

Messrs. MUNN & Co.—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.

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 written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY 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 they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individual whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. 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 they may acquire of a similar invention from the records in their Home Office. But for a fee of \$5, accompanied with a model, or drawing and description, they 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 the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. 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, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is so elicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d 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 law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, 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. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

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 is \$10. A pamphlet of advice re-

C, C, in a frame, B, in connection with the lever, F, attached to the knife and frame, B, all arranged to operate substantially as and for the purpose set forth.

Second, The slide, K, arranged in connection with the knife, D, lever, J, pawl, I, and rack, e, on carriage, G, to operate substantially in the manner, as and for the purpose herein set forth.

48,015.—Manufacture of Water Proof Fabrics.—Thomas Crossly, Bridgeport, Conn., (Assignor to American Water Proof Cloth Company, Brooklyn, N. Y.):

I claim as a new manufacture, a fabric formed by the combination of a coarse, textile material for a base, with a finer textile material or with fibrous material in the form of a bat or felt, a face, united by a coating or sheet of india rubber or other gum, or compounds thereof, in the manner and with the result, and for the purposes set forth.

I also claim as a new manufacture the fabric having a back or base of flax, cotton, jute, wool or other textile material, coated or covered with a sheet of india rubber or other vulcanizable gums, or the vulcanizable compounds thereof, and having a face of fibrous substances in the form of a bat or felt, or of other textile material, combined and united by pressure and by the vulcanization of the gums, and dyed and printed, or dyed and printed, or colored, or stamped, or embossed, for the purposes and in the manner described and set forth.

48,016.—Paper Collar.—William L. Duff, Quincy, Ill., (Assignor to Henry C. Banks.):

I claim a collar having its lower part slitted, so that portions at the back will pass outside of the cravat in the manner and for the purpose substantially as set forth.

48,017.—Pipe Tongs.—Samuel F. Gamage, (Assignor to himself and N. M. Dow), Boston, Mass.

I claim the solid screw and fulcrum, designated respectively by the letters, f, g, h, i, as operated by the milled nut, E, applied and arranged in the opening and slot in the stationary jaw lever, substantially in the manner and for the purposes above specified.

48,018.—Self-Centering Punches, Antedated May 16, 1865.—Samuel Z. Hall, Camden, N. J., (Assignor to himself and George Mott), Hoboken, N. J.:

I claim, First, The arrangement of the guide socket, F, which contains the center punch within a hinged frame, applied in combination with the box, or its equivalent, which contains the centering clamp, substantially as and for the purpose herein set forth.

Second, The arrangement of the guide socket within the said hinged frame to provide for its adjustment substantially as herein described to suit the thickness or depth of the head of a bolt or other headed article.

48,019.—Globe Stove.—George W. Herrick, Stuyvesant, N. Y., (Assignor to Samuel W. Gibbs), Albany, N. Y.:

I claim the drop-door, C, in combination with a foot-rest, B, when applied to a globe stove, in the manner substantially as and for the purpose herein set forth.

[This invention consists in combining a drop-door with a foot-rest, in such a manner that the foot-rest will serve as a support for the door when the latter is open, and prevent the breaking of the hinges of the door when the latter is opened or allowed to drop.

48,020.—Coal-Hod, Ash-Sifter, and Slop-Pail combined.—Charles Jones, (Assignor to himself and Charles Hodges), Brooklyn, N. Y.:

I claim the pail, A, provided with the cover, C, in combination with the sifter, D, constructed substantially as shown and connected when in use, to the cover, C, by an upright passing through the cover, or an equivalent means—all being constructed of sheet metal and arranged to form a combined coal-hod, slop-pail and ash sifter, as described.

48,021.—Copying Press.—Phineas Lawrence and George Jeffereys, (Assignors to themselves and Benjamin Lawrence), New York City:

We claim a copying press formed with a cam lever to act upon the follower in combination with the ratchet and pawl for the purposes and as specified.

48,022.—Casting Shot and Shell.—Thomas J. Lovegrove, (Assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

I claim casting shot and shell in a spherical mold, and afterwards rotating said mold on a concave or dish-shaped surface, substantially in the manner described, for the purpose set forth.

I also claim the combination of a rotating concave table having a raised central center with a spherical mold rolling freely thereon as described.

48,023.—Rose for Door-Knob.—Milton V. Nobles, Rochester, N. Y., (Assignor to himself and John C. Nobles), Rushford, N. Y.:

I claim in combination with the screw sleeve and hub, the pin, g, h, or key, e, for holding the two firmly together when adjusted, substantially as described.

48,024.—Fastening Door-Knobs to their Shanks.—Milton V. Nobles, Rochester, N. Y., (Assignor to himself and John C. Nobles), Rushford, N. Y.:

I claim as a fastening for door-knobs and shanks, the combined use of the turning sleeve, catch, and check-pin, with the hub and shank of the knob, substantially as and for the purpose described.

48,025.—Fastening Door-Knobs to their Shanks.—Milton V. Nobles, Rochester, N. Y., (Assignor to himself and John C. Nobles), Rushford, N. Y.:

I claim as a means of fastening a door-knob to its shank, the combined use of a split sleeve, and a ring, or ordinary rose plate, with the hub and shank, substantially as herein described and represented.

48,026.—Drill for Oil and other Wells.—William G. Oliver, (Assignor to himself, Samuel O. Bigelow, George H. Rendel, and David P. Benson), Buffalo, N. Y.:

I claim an expansion drill, consisting mainly of the drill stock, A, hinged drill pick, D, and connecting bar, B, and operated by a vertical up and down motion thereof for the purposes, and substantially as herein described.

I also claim the bottom section, E, in combination with the drill stock, A, for the purposes and substantially as described.

48,027.—Tool.—A. W. Park, (Assignor to himself and C. J. Winters), Norwich, Conn.:

I claim the implement above shown, comprising combined hammer claw, monkey-wrench, socket-wrench, and screw-driver substantially as described.

[This invention consists in a combination in a peculiar manner of several different tools so as to join in the same implement a hammer, a claw, a screw-driver, a socket-wrench and a monkey wrench, the whole implement consisting of only two pieces and a nut by which said pieces are connected to and adjusted with each other.]

48,028.—Stave-Cutting Machine, Antedated May 26, 1865.—M. Randolph, St. Louis, Mo., (Assignor to himself, J. Paddock, and Prescott and Burnett), St. Louis, Mo.:

I claim, First, The employment of the plungers, d, d, racks, d, d, and gear-wheels, f, f, or their substantial equivalents, in combination with the cutter frame, D, for the purpose of removing the cut staves and depositing them under the jointers substantially as herein specified and represented.

Second, I claim the arrangement and combination of a double-jointer, g, g, when constructed and adjusted to operate in such manner as to complete the jointing of both edges of the stave, at the same time, substantially as herein set forth and described.

Third, I claim operating the jointer, g, g, in harmony and conjunction with the cutter-frame, D, so that the staves may be cut and jointed without removal from the machine, substantially in the manner herein set forth and specified.

Fourth, The combination of the cutter heads, m, m, with the conveyors, n, n, constructed and arranged to operate as and for the purposes set forth.

And Fifth, The combination and relative arrangement of the cutter-frames, D, jointers, g, g, cutter heads, m, m, and conveyors, n, n, all being constructed and adjusted to operate conjointly substantially as and for the purposes herein set forth and specified.

48,029.—Horse Ray Fork.—Rensselaer Reynolds and Charles Young (Assignors to Rensselaer Reynolds), Stockport, N. Y.:

I claim, First, The trigger, D, provided with a lip, e, and applied in combination with the toggle arms, B, B', and two hinged gripping jaws, A, A', in the manner and for the purpose herein shown and described.

Second, The hand-lever, C, attached to the arm, B', and applied in combination with the jaws, A, A', and toggle arms, B, B' in the manner and for the purpose set forth.

[This invention relates to certain improvements in that class of hay-forks which operate with two hinged jaws in combination with toggle arms, in such a manner that, when the toggle arms are straightened out the jaws are firmly closed, and a load of hay taken up by them can be hoisted up to any desired height, and, by a slight pull on one of the toggle arms, they are thrown out of line, the jaws open, and the hay is dumped.]

48,030.—Amalator.—H. H. Scoville (Assignor to himself and E. C. Preble), Chicago, Ill.:

I claim, First, Projecting each bucket on a scroll, from the discharging eye or hub of the axial shaft, substantially in the manner and for the purpose described.

Second, The arrangement of the chamber, f, and screw, d, or their equivalents, at the discharge of the scroll chamber, substantially in the manner and for the purpose described.

Third, The cylinder, f, and screw, d, constructed and working together, substantially in the manner and for the purpose described.

Fourth, The mode of attaching the screw to the machine for submerging the quartz, substantially as herein described.

Fifth, A machine which discharges the quartz from its scroll submerging chamber directly into its screw conveying chamber, substantially as and for the purposes herein described.

48,031.—Manufacture of Boxes.—William T. Slocum (Assignor to James S. Mason & Co.), Philadelphia, Pa.:

I claim connecting the two ends of the strip, A, by forming on one end of the same the lips, a, and in the other end the slots, b, through which the said lips may be passed, and then bent down to one side or the other, substantially as described.

48,032.—Cotton Gin.—John Stevens (Assignor to himself and Theodore Bowne), New York City:

I claim the combination of the large cylinder, B, small roller, D, reciprocating plate, G, feed board, I, doffer plate, J, and pressure roller, F, all arranged and operating substantially as and for the purposes set forth.

48,033.—Means of Closing Ship's Deck and Side Lights.—Edmund B. Vannevar (Assignor to E. B. Vannevar & Co.), Boston, Mass.:

I claim the hinged staple, G, provided with an adjusting screw, H, constructed substantially as described, and used for the opening and closing of deck and side lights for vessels.

48,034.—Safety Tackle.—Pierre Joseph Jamet, Paris, France.

I claim First, The construction, substantially as herein described, of a safety tackle for the purpose of holding or maintaining weights in suspension during the intervals of pull.

Second, I claim the oscillating frame or block under the arrangement described, so that the pulley or sheaves, together with the rope or cord, perform the function of brake in connection with the cross-head of the hook, substantially in the manner hereinbefore set forth.

Third, The movable cam lever or catch, whether operated by the rope or otherwise, under the arrangement described, so as to prevent brake action, in the manner and for the purpose set forth.

48,035.—Photo-electrotype.—Wm. A. Leggo and Geo. E. Desbarats, Quebec, Canada:

We claim the within described process of producing upon the surface of any transparent picture, drawing or manuscript, by the action of light, a mold capable of yielding a cast in plaster or other suitable material, substantially in the manner and for the purposes herein set forth.

REISSUES.

1,976.—Base Burning Stove.—Dennis G. Littlefield, Albany, N. Y. Patented January 24, 1854. Reissued Nov. 19, 1861; again, August 26, 1862; again, March 3, 1863; again, Nov. 8, 1864; again, Feb. 28, 1865:

I claim the combination of a reserve fuel supplying cylinder, a separate fire pot, a chamber to receive the products of combustion, and a exhausting exit flue, substantially as and for the purposes described.

1,977.—Straw Cutter.—Warren Gale and B. B. Belcher, Chicopee Falls, Mass., assignee of Warren Gale. Patented, Dec. 18, 1860:

I claim, First, The arrangement of the knife pivot upon a stepor carrier, so as to produce angular and distance adjustments of the knife to the cutting edges of the stationary blade, or mouth piece, whether the carrier is in one piece with, or attached immediately to the mouth piece, or is separate therefrom.

Second, I claim also the combination and arrangement of the carrier, C, and flanch of the pivot, G, provided respectively with the longitudinal slot, and with the bolt hole, b, and transverse slot, c, for producing the adjustments desired, substantially as herein specified.

1,978.—Horse Rake.—Ariel B. Sprout, Hughesville, Pa. Patented November 25, 1862:

I claim sustaining the weight of the gang of curved metallic teeth, which are united to a common rake head, arranged behind the axle upon such a point of their length that they shall be balanced or nearly so upon a bar which is free to rotate with them, and which is independent of the draught devices, substantially as described.

DESIGNS.

2,072.—Boiler Lid.—John L. Hadden, Philadelphia, Pa.

2,073—2,077.—Carpet Pattern.—Fleming J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

2,078.—Lemon Press.—Isaac Townsend, Philadelphia, Pa.

TO OUR READERS.

**PATENT CLAIMS.**—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of \$2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

**RECEIPTS.**—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our receipt of their funds.

**INVARIABLE RULE.**—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

**MODELS** are required to accompany applications for Patents under the new law, the same as formerly, excepting design patents, when two good drawings are all that are required. The petition, specification and oath, except the Gov

guarding applications for patents and caveats furnished gratis, on application by mail. 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 is 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 fees, 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 a draft on New York, payable to the order of Messrs. 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 little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

**REJECTED APPLICATIONS.**  
Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their 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 MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is \$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 a 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

**SEARCHES OF THE RECORDS.**  
Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO. are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

**ASSIGNMENTS OF PATENTS.**  
The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

**FOREIGN PATENTS.**  
Messrs. MUNN & CO. are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery Lane London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

**INVITATION TO INVENTORS.**  
Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

**COPIES OF PATENT CLAIMS.**  
MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for \$1.

**EXTENSION OF PATENTS.**  
Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are sundered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

**UNCLAIMED MODELS.**  
Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

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 or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO., No. 37 Park Row, New York.



Subscriber, of Ohio.—The electric light is made by terminating the two points of an electric battery with two pieces of the carbon, which is taken from gas retorts, sharpened to points. While the battery is in operation the points are brought in contact and then separated two or three inches, when an arched bridge of light springs between the two, too dazzling for the eye to rest upon. This light, requiring no oxygen to support it, will continue, if inclosed in a vessel which is submerged under water, but the light must not be in contact with the water. Magnesium burns by combination with oxygen (producing magnesia), and, therefore, must have a supply of air; we do not know where it can be bought.

A. W. L. McE., of Mo.—Write to Henry Carey Baird for a treatise on making sugar from sorgho.

K. L. M., of N. Y.—Bottle glass is said to be the hardest variety. Glass of any kind may be scratched with a file.

S. H. W., of Ill.—If you mean by a "storm glass" a barometer; that is made by filling a glass tube, three feet long—that has one end closed, and the other open—with mercury, and then turning the open end down and inserting it into a cup of mercury. The mercury in the tube is prevented from running out by the weight of the atmosphere resting on the surface of the mercury in the cup. As the weight of the atmosphere varies, the height of the mercurial column in the tube, of course, varies to correspond—one balancing the other.

F. H., of Ohio.—We know of no late works on making sugar from cane. The juice is extracted by rollers, and in no other way.

L. J. L., of Ill.—Messrs. Todd & Rafferty, Patterson, N. J., have flax machines.

L. K., of Mass.—You will find the address very plainly given in the article on smelting iron by steam and air combined. As it is an English invention we know nothing beyond the article in question.

G. W., of N. J.—Stuffing birds is an art which requires practice and experience to succeed in. If you inquire at the book stores for a work on taxidermy you will learn something about the art.

J. A. H., of Ill.—You should consult an architect; we cannot give you the proportions of a church in this column.

**Back Numbers and Volumes of the "Scientific American."**

VOLUME IV., VII. AND VOLUME XI. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, \$3 00 per volume, by mail, \$3 75 which includes postage. 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. VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

**NOTICE TO SUBSCRIBERS.**

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

**RATES OF ADVERTISING.**

TWENTY-FIVE 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 eight 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.

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