

#### CAVEATS, COPYRIGHTS, TRADE may expect from us a careful consideration of their MARKS, ETC. plans, an honest opinion, and a prompt reply.

Messrs. Munn & Co., in connection with the publication of the SCIENTIFIC AMERICAN, continue to examine to Munn & Co. will be faithfully guarded and remain Improvements, and to act as Solicitors of Patents for Inventors.

In this line of business they have had OVER THIRTY YEARS' EXPERIENCE, and now have unequaled facilities for the preparation of Patent Drawings, Specifications, and the Prosecution of Applications for Patents in the United States, Canada, and Foreign Countries. Messrs Munn & Co. also attend to the preparation of Caveats, Trade Mark Regulations, Copyrights for Books, Labels, Reissues, Assignments, and Reports on Infringements of Patents. All business intrusted to them is done with special care and promptness, on very moderate terms.

We send free of charge, on application, a pamphlet containing further information about Patents and how em; directions concerning Trade Marks, to procure t Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases, Hints on the Sale of Patents, etc.

## Scientific American.

Wright's Pat. Bucket Flungers are the best. VALLEY MAUNISH Easthempton, Mass VALLEY MACHINE CO. DF HAVING DISSOLVED PARTNERSHIP, WE offer for sale a very large lot of Machinery for Wood and Iron Workers. Steptoe, McFarlan & Co., Cincinnati, O. Promotive sector of the most product of the sector of the THE BEST AND MOST ECONOMICAL **Boiler Feeder** FRIEDMANN'S INJECTOR, MANUFACTURED BY NATHAN & DREYFUS, New York. 108 Liberty St. Send for Circular. MACHINISTS' TOOLS NEW AND IMPROVED PATTERNS. Send for new illustrated catalogue. Lathes, Planers, Drills, &c. NEW HAVEN MANUFACTURING CO., New Haven, Conn. Blake's Patent Stone & Ore Crusher.

NEW PATTERNS, with important im-portant improvements, and abundant strength. This is the only machine used by the principal MUNICIPAL, RAILKOAD and MINING CORPORATIONS and CON-TRACTORS in the United States and foreign countries, for breaking hard and brittle substances TO ANY SIZE. Send for circular, Address, BLAKE CRUSHER CO., New Haven, Ct.

# Steel Castings,

price list to CHESTER STELL CASTING COMPANY EVELINA STREET, PHILADELPHIA, PA.

HARTFORD STEAM BOILER Inspection & Insurance COMPANY. W. B. FRAUKLID, V. Pres't. J. M. ALLEN, Pres't. I. B. PTERCE, Sec'V

### ROCK DRILLING MACHINES AIR COMPRESSORS MANUFACTURED BY BURLEIGHROCKDRILL CO. SEND FOR PAMPHLET. FITCHBURG MASS. SEND FOR PAMPHLET.

FOR THE LATEST IMPROVED STAVE Heading and Shingle Machinery, also the celebrated Bailey Gauge Lathe, Second-hand Boilers and Engines, or Special Machinery, address T. R. BAILEY, Agt., Lockport, N. Y.

FOR SALE, AT GREAT BARGAINS, One 18x26 Todd & Rafferty Engine, with 14 ft. band wheel, 26 in face; built in sections; weight, 14,000 lbs; in hammered iron shaft, 10 ft. long; Judson governor complete. One 14x18, heavy and strong, suitable for saw or grist mill; sft. 4 in band wheel, 19 in. face governor, and all complete. Also, one 10x24; one 8x20; one 7x16; one 6x16; and one 5x12, all new and first-class. Address J. C. TODD, 10 Barclay Street, New York, or at Works, Paterson, N. J.



AUGUST 4, 1877.



One copy of THE SCIENTIFIC AMERICAN and one copy of THE SCIENTIFIC AMERICAN SUPPLEMENT will be sent for one year, postage prepaid, to any subscriber in the United States or Canada, on receipt of seven dollars by the publishers.

The safest way to remit is by Postal Order, Draft, or Express. Money carefully placed inside of envelopes. securely sealed, and correctly addressed, seldom goes astray, but is at the sender's risk. Address all letters, and make all orders, drafts, etc., payable to

#### MUNN & CO.

37 Park Row, New York.

#### NOTICE TO FOREIGN SUBSCRIBERS.

Foreian Patents.-We also send, free of charge, a Synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world. American inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Five patents-embracing Canadian, English, German, French, and Belgian-will secure to an inventor the exclusive monopoly to his discovery among about ONE HUNDRED AND FIFTY 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. The expense to apply for an English patent is \$75; German, \$100; French, \$100; Belgian, \$100; Canadian, \$50. Address

MUNN & CO., 37 Park Row, New York city, Solicitors of Patents, and Publishers of the SCIENTIFIC AMERICAN.



What Security Mave I that my communication

Answer .-- You have none except our well-known in-

of a client's interests, when committed to our profes-

sional care, never has occurred, and is not likely to occur. All business and communications intrusted to us

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN,

37 Park Row, New York.

are kept secret and confidential.

confidential?

PERFECT **NEWSPAPER FILE** 

The Koch Patent File, for preserving newspapers, magazines, and pamphlets, has been recently improved and price reduced. Subscribers to the SCIENTIFIC AM-ERICAN and SCIENTIFIC AMERICAN SUPPLEMENT can be supplied for the low price of \$1.50 by mail, or \$1.25 at the office of this paper. Heavy board sides: inscription "SCIENTIFIC AMERICAN," in gilt. Necessary for every one who wishes to preserve the paper. Address

#### MUNN & CO.,

Publishers SCIENTIFIC AMERICAN.

Mechanics' Association, concerning Locomotives and Locomotive improvements. Narrow Gauge Locomotives, Indian State Railways, en-graving and dimensions. Supplement No. 53. 10 cents. New Railway Locomotive Crane, by Black, Hawthorne & Co. Four engravings to scale, dimensions, etc. Supple-ment No. 54. 10 cents. New Road Locomotive, by Marshall Sons & Co. General description and one engraving. Supplement No. 56. 10 cents.

the scription and one engraving. Supplement No. 36, Biopress Passenger Locomotives, Great Western Railway. Bibress Passenger Locomotives, Great Western Railway. With five engravings, and tables of all the principal di-mensions. Supplement No. 58, 10 cents. Locomotive for Biorning Petroleum, -Used on Russian Railways. With description and five illustrations. Sup-plement No. 63, 10 cents. Steam Trolly or Chair. -Used on Oude Railway. Two engravings. Supplement No. 63, 10 cents.

11 9-	BROOKLYN, N. Y.	NOTICE TO FOREIGN SUBSCRIBERS.
n		The new Postal Union now offers special facilities for
s	LOCOMOTIVE ENGINEERING.—THE most recent and best examples of Locomotive Construc-	the regular and speedy transmission of the SCIENTIFIC AMERICAN direct from the office of publication in New
	tion, with scale drawings, tables of principal dimen- sions, general description, etc., are given in the SCIEN- TIFIC AMERICAN SUPPLENENT. The following may be had at this office, or ordered through any News-	York to subscribers in foreign countries. The subjoined table exhibits the yearly subscription prices of the SCIENTIFIC AMERICAN and SUPPLEMENT in the principal
	dealer. Sent by mail prepaid. Please order by the numbers here given. Express Locomotives of the London, Chatham and	foreign currencies, payable in advance:
	Dover R. R. Tank Locomotives. With Specifications, Dimensions, Particulars and three Engravings. Supple- ment No. 23. 10 cents. Locomotives at the Contennial. A series of Eighteen Outline Illustrations, showing the Frincipal Locomotives exhibited at the Centennial, with their measures, and a	The prices are for one year's FOR FOR subscription, in- SCIENTIFIC SUPPLE- cluding the post- AMERICAN. MENT. age.
	table of principal dimensions of each locomotive. Sup- plement No. 35. 10 cents. Baldwin Locomotive.—Large engraving in sectional ele- vation, with measures, scale, and table of dimensions.	Anstria  S. Fl.  9  13  .20    Belgium  Francs  20
	Supplement No. 38. 10 cents. Narrow Gauge Swedish Locomotive, with one page of engravings. Supplement 41. 10 cents. Locomotives of the Eighteen Inch Radivary at Crewe, Eng. Two engravings. Supplement 44. 10 cents.	France  Frances  30  46    German  Empire.  R. M  16  25  37    Great  Britain  Shillings.16  24  36  36    Heilane  H. F  9  14  21  36    Haly  Frances. 20
	I Locomotive Passenger Engines of Midland Railway, with table of dimensions. Three engravings. Supplement No. 27. 10 cents. The same number contains report of valuable information given before the Master Mechanics' Association, concerning Locomotives and	Norway  Kro  15
2	Locomotive improvements. Narrow Gauge Locomotives, Indian State Railways, en- graving and dimensions. Supplement No. 53. 10 cents.	The best way to remit is by Postal Order. Make the

Make the The best way to remit is by Postal Order. order payable to MUNN & CO., New York, United States, and forward the order to us with the name of the sender and the address to which the paper is to be mailed.

#### MUNN & CO.,

Publishers SCIENTIFIC AMERICAN,

New York.

THE "Scientific American" is printed with CHAS. ENEU JOHNSON & CO.'S INK. Tenth and Lom-bard Sts., Philadelphia, and 59 Gold St., New York.