

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN.

A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, for the U. S., Canada or Mexico. \$1 00
One copy, six months, for the U. S., Canada or Mexico. 1 50
One copy, one year, to any foreign country belonging to Postal Union. 4 00

The Scientific American Supplement is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, for the U. S., Canada or Mexico. \$6.00 a year to foreign countries belonging to Postal Union. Single copies, 10 cents. Sold by all newsdealers throughout the country. See prospectus, last page.

Building Edition.

THE ARCHITECTS AND BUILDERS EDITION OF THE SCIENTIFIC AMERICAN is a large and splendid illustrated periodical, issued monthly, containing floor plans, perspective views, and sheets of constructive details pertaining to modern architecture. Each number is illustrated with beautiful plates, showing desirable dwellings, public buildings and architectural work in great variety. To builders and all who contemplate building this work is invaluable. Has the largest circulation of any architectural publication in the world.

Spanish Edition of the Scientific American.

LA AMERICA CIENTIFICA E INDUSTRIAL (Spanish trade edition of the SCIENTIFIC AMERICAN) is published monthly, uniform in size and typography with the SCIENTIFIC AMERICAN. Every number of La America is profusely illustrated. It is the finest scientific, industrial trade paper printed in the Spanish language. It circulates throughout Cuba, the West Indies, Mexico Central and South America, Spain and Spanish possessions—wherever the Spanish language is spoken. \$3.00 a year, post paid to any part of the world. Single copies 25 cents. See prospectus.

The safest way to remit is by postal order, express money order, draft or bank check. Make all remittances payable to order of MUNN & CO. Readers are specially requested to notify the publishers in case of any failure, delay, or irregularity in receipt of papers.

NEW YORK, SATURDAY, DECEMBER 2, 1893.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Agricultural implements, new', 'Air currents, etc.', 'Ants, Florida', 'Ark, the, its size, etc.', 'Bicycle tires, patching', 'Blocks, erratic', 'Boats, torpedo, British', 'Books and publications, new', 'Burner, hydrocarbon, Williams', 'Candles, stearin, manufacture of', 'Chloralamin', 'Colors, action of light on dyed', 'Columbia, war ship', 'Decimal pointer', 'Directum, stallion', 'Distilling plant, illicit', 'Dynamite, terrible effects of', 'Electrical engineer, how to become an', 'Electrical inventions, recent', 'Explosion, Columbian', 'Jarecki Mfg. Co.'s exhibit', 'Moonshiner's plant at', 'The North', 'state', 'Farming, does it pay?', 'Fireworks, Chinese', 'Gases, poisonous', 'Glow light solution', 'Gold, soluble', 'Ink erasers, chemical', 'Insect bites, protection from', 'Inventions, recently patented', 'inventor, a royal', 'Languages, how to acquire', 'Light, range, largest', 'Machine, boring and drilling', 'Machine, sewing, how to light', 'Mechanical devices, new', 'Mount St. Helens, flying rocks of', 'Navy, Brazilian, New York contingent', 'Navy, new Brazilian', 'Nickel and tinning processes', 'Notes and queries', 'Oil, macassar', 'Patent Commissioner's report', 'Patents granted, weekly record', 'Petroleum as fuel', 'Photographing on wood', 'Photographs, stereoscopic', 'Pineapples, American', 'Physician, the true', 'Port, a new Texas', 'Railway accidents', 'Railway car fenders', 'Railway cars, cost of', 'Science, curiosities of', 'Signal, fog, electric', 'Smoke, Lancashire', 'Surgery in China', 'Sugar production, immense', 'Taste, to obscure the', 'Thill support, Meyerhoff's', 'Trade marks registration', 'Tulip tree insects', 'Waterbury Watch Co., the', 'Whale, stranded'

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 935.

For the Week Ending December 2, 1893.

Price 10 cents. For sale by all newsdealers.

Table listing contents of the supplement with page numbers: I. ARCHAEOLOGY.—The Colosseum.—Recent discoveries at the Colosseum.—The results of new excavations.—1 illustration. 14947
II. CHEMISTRY.—Valuation of Leather Glue.—By F. GANTER.—Analysis of glue for the determination of its commercial value. 14950
III. COLUMBIAN EXPOSITION.—Hagenbeck's Circus.—One of the great attractions of the Midway Plaisance described.—1 illustration. 14948
State and Foreign Buildings at the World's Columbian Exposition.—The buildings of New South Wales, Haiti, Utah, Kentucky, Louisiana, and Maryland.—6 illustrations. 14942
The World's Columbian Exposition.—The Liberal Arts.—Germany, Austria, and Japan.—By L. P. GRATACAP.—A general and popular review of some of the striking exhibits at Chicago. 14943
IV. EDUCATION.—Technological Schools.—Their Purpose and its Accomplishment.—By ROBERT H. THURSTON.—The conclusion of Prof. Thurston's paper read before the World's Educational Congress at Chicago. 14940
V. ELECTRIC ENGINEERING.—Underground Electric Railway, London.—The City and South London Railway.—A full account, with financial reports and details of construction and plant of this railroad.—1 illustration. 14944
VI. MECHANICAL ENGINEERING.—Ball Bearings.—Extended use of ball bearings in machinery.—How they are manufactured and machinery used for making the balls.—9 illustrations. 14938
VII. METEOROLOGY.—Icebergs in the Southern Ocean.—By WILLIAM ALLINGHAM.—Recent reports from the South Atlantic.—Remarkable prevalence of icebergs in 1892. 14947
VIII. MISCELLANEOUS.—Fishing on the Coast of Tonkin.—Fishing by the Chinese and Annamites.—An important industry of the Pacific coast.—2 illustrations. 14946
IX. NAVAL ENGINEERING.—The Columbia's Performance.—General notes of the Columbia's trial trip.—The Olympia's first trial trip.—The First Atlantic Screw Steamship.—A six-masted screw ship of 1845.—1 illustration. 14937
The Italia (of the Italian Navy) the Largest Warship in the World.—1 illustration. 14235
The Triple Screw Warship Columbia.—A full account of the Columbia, of her trial trip and comparison with other ships.—1 illustration. 14936
Triple Screw Propulsion.—The details of triple screw propulsion.—Its advantages and general features. 14936
Trafalgar, October 21, 1805.—A description of Nelson's great victory.—Condition of her sails after the action.—1 illustration. 14938
X. PHOTOGRAPHY.—Isochromatic Photography.—By G. CRAMER.—Notes of the last advance in photography.—The advantages and disadvantages of the new plates. 14941
XI. PHYSICS.—A Color-Tint Photometer.—A very ingenious elimination of the subjective error in photometry by color contrast. 14946
The Tireless Waltzers.—A pretty experiment in surface tension. 1 illustration. 14946
XII. SANITATION.—Sanitary Notes and Beams.—By ALBERT L. GRON.—Abstract of a very important paper read before the section in hygiene, climatology and demography of the Pan-American Medical Congress.—An instructive and popular paper on the preservation of life by cleanliness. 14943
XIII. TECHNOLOGY.—Oil of Amber.—By A. JOLLES.—The preparation of this oil, details of the process, purification and bleaching. The Refining of Petroleum.—The refining of petroleum as conducted by the Standard Oil Company, with notes on the Company's exhibit at Chicago. 14941

REPORT OF THE COMMISSIONER OF PATENTS.

The Commissioner of Patents is required to make two annual reports of the condition of the Patent Office, one to Congress, at the beginning of each year, and one to the Secretary of the Interior in the middle of the year.

Commissioner John S. Seymour's report to the Secretary, for the fiscal year ending June 30, 1893, has just appeared, which shows that 39,539 new applications for patents were made during the year preceding, 23,471 patents were granted, 8,283 applications were waiting official action, and the remainder stood rejected or requiring amendment. The total receipts were \$1,288,809 and the expenses \$1,111,442.

The Commissioner strongly recommends a philosophical classification of the issued patents in order to facilitate the work of official examinations; also the establishment of a more comprehensive scientific library; also provisions for a systematic examination of existing industries in all parts of this country. All these are excellent suggestions, and if carried out would greatly add to the value of the official scrutiny of applications.

The Commissioner further recommends that the supply of free copies of the Official Gazette to libraries may be increased, so that inventors may have a more ready access to the publication. The crowded condition of the Patent Office, the wrong thus done to the health of employes, and the great losses to the government from the same cause are strongly set forth and relief urgently asked.

The Commissioner's report has the merit of brevity; while all his recommendations are practical, and their adoption would be of great advantage to the bureau as well as to the public.

THE REGISTRATION OF TRADE MARKS.

The scope of the rights conferred by the registration of a trade mark and the limits of the authority of the Commissioner of Patents in dealing with an applicant for registration are the subjects of a very lengthy decision recently handed down by the Supreme Court of the District of Columbia. The State of South Carolina, under a special law, the so-called Dispensary Law of December 24, 1892, assumed control of the liquor traffic of the State. In virtue of this action it became the owner of a trade mark used in connection with such traffic, and it applied to the U. S. Patent Office for registration of the same.

The case first was passed upon by the Examiner of Trade Marks, who refused it registration on the ground that a State of the American Union is not a corporation as contemplated in the Trade Mark Act of March 3, 1881. He virtually decided that if a State could register a trade mark, then the one in issue could be registered. On appeal the case went to the Commissioner of Patents. He abandoned the examiner's ground for rejection as untenable, and introduced a new and original one of his own. He refused registration on the ground that, even if the State could enter the field of commerce, it had not done so by the legislation (i. e., the Dispensary Act) before him. He says: "Notwithstanding the acts of its Governor and State Board of Control," the State of South Carolina "has no authorized trade in liquors outside its own limits." Therefore he denies the appeal.

The decision of the Supreme Court states what registration of a trade mark does. It gives no new property right, it grants no monopoly of use. The grant differs radically from that conferred by the regular letters patent. It simply confers upon the one registering it the right to sue a citizen of his own State in the federal courts, provided he proves that he uses the trade mark on goods intended for commerce with foreign nations or Indian tribes. There was no question that the State of South Carolina used the trade mark in issue in foreign commerce. The contention of the Commissioner was that such engaging in foreign commerce was unlawful, or outside of the scope of the Dispensary Act, and therefore he refused the registration.

The decision of the Supreme Court says that it does not appear that Congress ever intended to impose upon the Commissioner of Patents the ascertainment and determination of the question whether "the applicant is lawfully engaging in foreign commerce." The Commissioner's duty is to ascertain prima facie "whether he (the applicant) is lawfully entitled to use the trade mark sought to be registered, and, in the next place, to ascertain from the showing that is made to him whether that trade mark so lawfully used by the applicant is used in foreign trade." But it will be observed that with the lawfulness of the trade itself the Commissioner has no concern.

The determination of the lawfulness of the commerce in which the trade mark is to be used, the Commissioner must deem imposed upon him by the following clause of the law: "No alleged trade mark shall be registered unless it appear to be lawfully used as such by the applicant in foreign commerce." The court, after quoting this clause to determine its meaning, says: "Clearly this word 'lawfully' relates to the character of the right of the applicant,

and not to the character of the foreign commerce." A peremptory writ of mandamus requiring registration of the trade mark was accordingly issued.

The whole decision, which covers over five pages of the Patent Office Gazette, is worthy of the most careful reading. It will be accepted as one of the leading trade mark decisions, and we trust will be of use in determining a more liberal treatment by the Patent Office of applicants for registration of trade marks.

TERRIBLE EFFECTS OF DYNAMITE.

The seaport town of Santander, near Bilbao, on the north coast of Spain, was the scene of a terrible disaster on Nov. 3, causing the loss of between two and three hundred lives, with serious injuries also to several hundred other persons, and great destruction of property, including damage to many houses in the town. A Spanish coasting steamer, called the Machichago, with a cargo which consisted of barrels of spirits, petroleum and above fifty tons of dynamite, was unloading at the mole. Some portion of the inflammable cargo took fire. Efforts were made, under the direction of the town police, acting in the presence of the governor, to remove the dynamite and the petroleum, while a steam tug was brought alongside the burning ship, to tow her away from the quay, which was crowded with people. At half past four in the afternoon, probably from the concussion produced by the sudden bursting of the steam boilers, the whole interior of the vessel was shattered, its contents were mingled together, and the dynamite was ignited; there was a series of tremendous shocks. The ship and the steam tug were blown to pieces, scattered over the harbor and the quay, and at least sixty houses, as well as several vessels lying near, and a train at the railway station, were set on fire by the blazing fragments. The governor of the town and several other official persons of rank were among those killed.

Dynamite, as most of our readers know, is a preparation of nitroglycerine, which latter is made by treating glycerine with a mixture of nitric and sulphuric acids. Nitroglycerine is an oil and possesses the remarkable quality of violent explosion when subjected to slight pressure. It is therefore very dangerous to handle. To diminish this danger, and also to prevent it in the form of a powder, an absorbent substance is mixed with it, which holds the liquid nitroglycerine within its pores and acts as a cushion that prevents the nitroglycerine from exploding under light pressures, such as ordinary handling.

Dynamite is the name given to nitroglycerine when thus protected by an absorbent. Porous microscopic shells, known as infusorial earths, form the best absorbent, and this material is used in the manufacture of dynamite. When dynamite is subjected to sufficient pressure, by concussion, for example, when contained in a bomb which is allowed to fall upon the ground from a suitable height, it explodes with terrific force. The explosive power of dynamite is eight times greater than gunpowder, and in general, for ordinary use for blasting purposes, it is cheaper and safer than gunpowder; but for some kinds of blasting, particularly in coal mining, specially prepared gunpowders are preferred.

The most authentic history of gunpowder attributes its discovery to a German chemist named Berthold Schwarz, some time during the century beginning with the year 1300; and this remained for more than five hundred years the explosive most commonly used, until the invention of gun cotton by Schonbein in 1846 and of nitroglycerine by a French chemist, A. Sobrero, in 1847, in the laboratory of Pelouze, Paris.

The action of nitric acid to render cotton and other substances explosive was discovered by Pelouze in 1838.

NEW BRITISH TORPEDO BOATS OF EXTRAORDINARY SPEED.

The Havock is the name of the first of two new gun boats lately completed by Messrs. Yarrow for Her Majesty's navy, which on a recent trial yielded remarkable speed results. On the three hours' run, in rough weather—the wind blowing 30 miles per hour—a speed of over 26 knots was reached. On the measured mile the mean of four runs was 26.78 knots. The fastest mile run was at the rate of 27.565 knots, and the mean of the best two runs was over 27 knots. This is believed to be the fastest craft afloat. The indicated horse power was 3,400, and the engine revolutions 362 per minute.

The boats have twin screws, and generally resemble the first class torpedo boats built by this firm. The length is 180 feet and the width 18 feet 6 inches. There is the usual hood or turtle-back forward, although some modifications have been introduced with a view to getting a drier deck when the vessel is steaming into a head sea. The propellers are three-bladed. The engines are of the usual tri-compound type adopted by the firm, having cylinders 18 inches, 26 inches, and 39 1/2 inches in diameter by 18 inches stroke. The boilers, two in number, as stated, are of the locomotive type, and have copper fireboxes with copper tubes. The total grate surface is about 100 square feet and the total