

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, postage included... \$3 20 One copy, six months, postage included... 1 60 Clubs.—One extra copy of THE SCIENTIFIC AMERICAN will be supplied gratis for every club of five subscribers at \$3.20 each; additional copies at same proportionate rate. Postage prepaid.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly; every number contains 16 octavo pages, with handsome cover, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, postage paid, to subscribers. Single copies 10 cents. Sold by all news dealers throughout the country.

Combined Rates.—THE SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, postage free, on receipt of seven dollars. Both papers to one address or different addresses, as desired. The safest way to remit is by draft, postal order, or registered letter.

Address MUNN & CO., 37 Park Row, N. Y. Subscriptions received and single copies of either paper sold by all the news agents.

Publishers' Notice to Mail Subscribers.

Mail subscribers will observe on the printed address of each paper the time for which they have prepaid. Before the time indicated expires, to insure a continuity of numbers, subscribers should remit for another year. For the convenience of the mail clerks, they will please also state when their subscriptions expire.

New subscriptions will be entered from the time the order is received; but the back numbers of either the SCIENTIFIC AMERICAN or the SCIENTIFIC AMERICAN SUPPLEMENT will be sent from January when desired. In this case, the subscription will date from the commencement of the volume, and the latter will be complete for preservation or binding.

VOL. XXXVII., No. 5. [NEW SERIES.] Thirty-second Year.

NEW YORK, SATURDAY, AUGUST 4, 1877.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Adulteration of food', 'Lizard, Carolina', 'Locust, the seventeen year', etc., with corresponding page numbers.

TABLE OF CONTENTS OF

THE SCIENTIFIC AMERICAN SUPPLEMENT, No. 88,

For the Week ending August 4, 1877.

- I. ENGINEERING AND MECHANICS.—Spruce Creek Tunnel, Pennsylvania Railway. 1 engraving.—A Railroad in the Clouds: Being a full account of the remarkable Peruvian Railway Works now extending over the Andes Mountains. 1 engraving. Rack Railways. With 3 illustrations.—Hoosac Tunnel.—Broad Wheel Tires. Russian Torpedo Boats. 2 illustrations of Torpedo Boats used on the Danube. The 100 Ton Armstrong Gun. 1 figure.—How to Construct Unsinkable War Vessels.—The Nicaragua Canal. Mine Ventilation. By E. HAMER CARBUTT. 3 figures and tables. A valuable paper. New Ten Horse Power Engine, by Watts & Co. 3 engravings. The Tides. By Prof. ELIAS SCHNEIDER. A most interesting paper, giving a new and clear explanation of the phenomena. 2 figures.—Fine Water Drops. How Steam Increases its Own Heat.—Sulphurous Castings.—Fuel Used to Smelt a Ton of Iron.—Process of Applying Oxygenized Air in Blast Furnaces. By CHARLES HORNBOSTEL.—Improved Ore Washer. 2 figures. II. ELECTRICITY, LIGHT, HEAT, ETC.—Improved Electric Light. By NICOLAS EMILE REYNIER. P. ris. 3 illustrations.—Edison's Pressure Relay.—Capillary Electrometers. 4 engravings.—Red or Green?—Physical Society, London. Optical Bench. Thermometers. Electrical Selection. III. CHEMISTRY AND MINERALOGY.—Gases Enclosed in Lignite Coal and Mineral Resin.—Apparatus for Gas Analysis. By Dr. FRANKLAND.—Narcotin. Cotarnin. Hydnocotarnin. By Dr. WRIGHT.—Oleo of Limes. By PRESSE and WRIGHT.—Heptyl Alcohol.—Proceedings of Chemical Society, London.—Salts of Chrome Sesquioxide. IV. TECHNOLOGY.—Manufacture of Beet Root Sugar, by EDW. LEFROY CULL.—Defecation; the Milk of Lime; Carbonation and evaporation. A valuable paper. Photo Notes.—Removing Silver Stains from Clothing.—Blisters on Albumen Paper.—Iron Spots on Clothing.—Silvering glass.—Impressions of Negatives.—Washing Silver Pictures.—New Gold Salt for Photography.—Dry Coffee Process.—Chloride of Palladium Process.—Instantaneous Photography.—Accelerating Liquid.—Collodion.—Preparation of Photo-Lithographic Paper. By Professor HUSNIC, Prague.—Prizes offered by the Vienna Photographic Society.—Mounting Photographs. By WALTER B. WOODBURY.—How to enlarge and Photograph Microscopic Objects. By M. A. RUTOT.—Butterfly Color.—Purpura.—Paper from Cactus. V. NATURAL HISTORY, GEOLOGY, ETC.—Hair Snakes.—Mt. Diabolo Coal.—Freezing microtome, by Mr. LEWIS, 1 engraving. VI. AGRICULTURE, HORTICULTURE, ETC.—Prices of Nursery and Greenhouse products, Home and Abroad.—By PETER HENDERSON.—Best Method for Haymaking.—Indian Corn as Food for Man.—Utilization of Dead Animals.—Forests of Sweden.—The European Walnut. VII. MISCELLANEOUS.—Methods of Frauds on Life Insurance Companies.—European Labor.—Origin of the American Flags and other Flags.

Terms.—SCIENTIFIC AMERICAN SUPPLEMENT, one year, postpaid, five dollars. One copy of SCIENTIFIC AMERICAN and one copy of SCIENTIFIC AMERICAN SUPPLEMENT, one year, postpaid, seven dollars. CLUBS.—One extra copy of the SUPPLEMENT will be supplied gratis for every club of five SUPPLEMENT subscribers at \$5.00 each.

All the back numbers of the SUPPLEMENT, from the commencement, January 1, 1876, can be had. Price 10 cents each.

NOW READY.—THE SCIENTIFIC AMERICAN SUPPLEMENT for 1876. Complete in two large volumes. Over 300 quarto pages; over 2,000 engravings. Embracing History of the Centennial Exhibition. New Illustrated Instructions in Mechanical Drawing. Many valuable papers, etc. Price five dollars for the two volumes, stitched in paper; or six dollars and fifty cents, handsomely bound in stiff covers.

Remit by postal order. Address MUNN & CO. PUBLISHERS, 37 Park Row, New York.

Single copies of any desired number of the SUPPLEMENT sent to any address on receipt of 10 cents.

TORPEDO DEFENCE—INVENTION WANTED.

An invention that will protect ships of war from attacks of torpedoes is wanted; and this want ought to stimulate the inventive skill of mechanics and scientific men. Torpedoes in some form have played an important part in the wars of latter years, but these torpedoes were not the infernal machines that are now being employed. In former days they were receptacles filled with explosive material, and were either anchored in the pathway of vessels or floated to the object that was desired to be destroyed. They were fired by concussion, clockwork, or time fuse. The location of such torpedoes could most generally be discovered, if proper attention was directed toward their places of concealment.

Torpedoes of that class were playthings compared with the inventions of Lay, Ericsson, Whitehead, and Thorneycroft. The approach of these messengers is submerged and their pathway cannot be discovered by the assailed party. From them the greatest danger is to be apprehended.

Let us take, for example, the Lay torpedo, notices of which performance have appeared in our columns, and there seems to be but little protection from its attack. It is launched silently, and with accuracy it speeds toward its intended victim. The operator being on shore, or at a distance, is able to navigate it through crooked and intricate channels, and direct it at his will to unerringly strike its formidable antagonist and sends him a wreck beneath the waves. But if this antagonist be anchored, precautions of safety may be employed. A net-work of iron may be supported on booms, or pendent below the vessel's keel, through which the torpedo cannot burst. A cordon of ropes may surround the vessel, supported on boats in which are watchful crews to give an alarm. Other devices may be employed; but they more or less interfere with the sailing qualities of the vessel, and would seriously retard its management should an antagonist present himself, and an engagement ensue.

Protruding spars may keep off a torpedo boat, similar to the Thorneycroft launch, and the electric light would determine its position. But let this vessel be attacked by the Lay torpedo, or others of like character, and such defense is futile. The net-work of wire will keep it at a distance, but the objections to its use, except at anchorage, are as given. At a recent attack of four torpedoes upon a Turkish vessel in the Danube, the commander saved his vessel by coolness and quick maneuvering. But the type of some war vessels is such, especially those heavily armored, that they cannot be thus handled, and would therefore at times present opportunities for the approach of their fleet-moving antagonists.

What the protection for the swift and unseen movements of submerged torpedoes may be, the future can only decide. It is left for inventors to work out. As a hint, we say study well the action and approach of the torpedo, submerged as it is. Remember they are swift and unseen in their movements, impregnable to attack, and most destructive in their effects. That a defence can be wrought out that will be all that can be desired we have no doubt, and he may consider himself fortunate who does it.

NOTES OF PATENT OFFICE DECISIONS.

Upon the refusal of the Commissioner of Patents to grant a reissue in the case of Mayall & Williams on the ground that an interfering application had been filed subsequent to the date of their patent, and that the grant of this reissue depended on a question of priority, to be determined by him, as between the interfering application for patent and the patent of Mayall, the Supreme Court of the District of Columbia declared this decision of the Commissioner void and of no effect, and decided that the appellants were entitled to a reissue and that the same be reissued to them.

Upon the rendering of this decree the rules of the Patent Office have been amended to accord with this decision. All interferences now pending between reissue applications of prior patents and later patents, or with applications for reissues of later patents, or with subsequent original applications, will be dissolved; but on motion, the record in the interference proceeding may be amended by the substitution of the reissued patent in place of the original patent. An application has been made by C. W. Siemens for a reissue of a patent on furnaces granted in 1869. Some claims were set up for devices contained in certain expired foreign patents, the inventions of the applicant. The Commissioner has decided that the applicant had no right to a reissue, and could not claim matter shown in a prior foreign patent that has expired. One of the reasons given is that the subject matter could not be protected in the courts, and on that account the patent should be refused, that in such cases no distinction should be made between the original application and reissues. No color should be given to an individual claim, by granting a patent purporting to secure a right, when the Office has no such right to confer.

Under the act of 1836, patents were limited to fourteen years from the date of foreign patents previously obtained. Under the act of 1861, all patents granted were to remain in force for seventeen years from the date of issue. In the act of 1870, patents granted to foreign inventors were limited to seventeen years from the date of such foreign patent.

The object of the reissue section is to provide a means of correcting individual patents; and if the period for which the grant was originally made has expired, the right to claim the invention in a reissue does not exist.

That portion of the invention patented in England in 1861

has not yet expired by limitation of seventeen years from its date, and can be retained.

An appeal from the decision of the Examiners, and confirmed by the Commissioner, has been made in the case of W. W. Bierce, for improvement in strip or ribbon tickets. The object is to use these tickets on street railways. The design was to sell these tickets in strips, with one or more tickets made to be redeemable. The decision was that this form of tickets was old, and that the system of redeeming tickets old also. The refunding of money to the possessor of certain tickets is not essentially an improved device or article, but rather a method of transacting business, and this method is not patentable, as it neither relates to a machine, manufacture, or composition of matter.

A claim had been made by James Arkell for a paper bag with a jaggedly cut mouth and also the method of making it. The claim for the article was rejected, which was acquiesced in and the claim stricken out. A few days before issuing the patent for the process, the applicant filed a claim for the article. He should have applied for a reissue, and included this claim therein. The Commissioners concurred in the views of the examiners that a notch had been used in others than these with a jaggedly cut mouth and for precisely the same purpose, to facilitate opening, and it merely resulted in the double use of an old device.

TRADE MARKS.

The registration of a trade mark that is not identical with yet so closely resembles another as to mislead the public, is denied to Coggin, Kidder & Co., as is also the addition of an arbitrary symbol of a Maltese cross to the trade mark, which is declared not to amount to sufficient difference to warrant registration. In the judgment of the Commissioner, the leading word was calculated to mislead the public, yet when the two words were seen side by side, the difference could readily be perceived.

In the application for a trade mark by W. S. Kimball, filed in eight different arrangements of figures in connection with the trade mark, to show the modes in which it had been applied and used, the decision was that the facsimile of the trade mark was sufficient, and that no protection is afforded to the use of scrolls, or figures that are not an essential part of the mark. To recognize them would tend to mislead the public as to the scope and nature of the registration.

The question of priority in the use of a trade mark in the case of Swift vs. Peters has been decided to have nothing to do with the question as to who first conceived the idea, or to describe and propose its use. In this respect a trade mark differs from patentable matter. The trade mark is the property of the party who puts it into actual practice. If an employee suggests the use of a mark and places it upon the packages of his employers, by whom it is adopted, it is considered the property of the employer, and its claim denied to the employee who suggested it.

RECENT GREAT IMPROVEMENTS IN ELECTRIC ILLUMINATION.

Jablochkoff, of St. Petersburg, Russia, who invented the electric candle which we described on page 339 of our last volume (June 2, 1877), has since made most important improvements in the method of electric illumination, which consist, first, in sub-dividing a current, producing a single too intense-light in several smaller ones, say fifty, each producing a light of an intensity measured by one to fifteen in these smaller lights.

It may be well to observe here that the Russians are very deserving in the pursuit of science, especially the electrical branch: it was Jacobi, in St. Petersburg, who, forty years ago, made the first electrotypes and navigated the Neva with a boat propelled by an electro-magnetic motor; and now it is Jablochkoff who makes electric illumination such a success that it is bound to supersede other methods.

Since his first experiments with electric candles he found, that, if a continuous light is obtained by one single current in several of his candles, it is chiefly due to the fact that the isolating substance between the carbons is, at its upper end between the luminous points, in a highly heated and nearly fused condition. In this state it offers a much better conductor to the current than it finds between the carbon points attached to regulators where the current has to pass through the resistive atmosphere. Experience showed that with a certain tension of the current excited by the machine, the limit to which this current can be subdivided through the melted conductors is sufficient to generate several luminous points of relatively high luminosity. But no more than eight electric candles could, in this way, be fed by a single machine of middling size.

Jablochkoff, therefore, tried the action of the electric spark, produced by a current of high intensity, upon fire-proof bodies. He passed the current of a dynamo-electric machine through the inner wire of a Ruhmkorff induction coil, and caused the spark of the induced current in the outer wire to act upon small bars of kaolin, which were placed between the terminals of the outer coil. This current was strong enough to glow and melt small kaolin bars, but was not capable of making them highly luminous.

The next experiment was to pass the current through better conductors which would, as it were, attract the current, and which he fixed to the edge of the kaolin bar, which, being a conductor of great resistance, by passing a current of high intensity, became white hot, and emitted a fine light. A small consumption of kaolin was observed, which, during