

## Varnish Trees.

The order Anacardiaceæ, or Terebinths, comprises trees or shrubs that yield a resinous, gummy, or milky juice, which, although usually acrid and highly poisonous, yields products of economic or commercial importance. Such is the case, for example, with the *Anacardium occidentale*, a large tree with the aspect of a walnut tree, which is cultivated in the West Indies and other warm countries for its fruits, which are known as cashew nuts. The stem of this tree furnishes a milky juice, which, as it dries, becomes black and hard and is used in India as a varnish. A gum is also secreted by this plant that has qualities like those of gum arabic. It is exported to Europe from South America under the name of cadji gum.

The varnish of Sylhet is chiefly procured from *Semecarpus Anacardium*, the marking nut tree of India. The juice of this tree, when dry, forms a black varnish much used in India, and, among other purposes, is employed, mixed with pitch and tar, in the calking of ships.

*Melanorrhœa usitatissima*, the theet-su of Tenasserim and the kheu of Manipur, produces wood that is so hard and heavy that anchors for native boats are made of it. The most valuable and extensively used product of the tree, however, is the black lacquer that it yields, and which is known as Martaban varnish. This is obtained by the process of tapping; short joints of bamboo closed at the bottom being thrust into holes bored in the trunk and left for two days, when they become full of a whitish thick juice which turns black when exposed to the air, and requires to be kept under water in order to preserve it. All kinds of domestic utensils and furniture are lacquered with this juice, which is laid on thin, and slowly dried, the change from black to white being, according to Sir D. Brewster, attributable to its losing its organized structure and becoming homogeneous, and then transmitting the sun's rays, which, in its previously organized state, it dispersed.

Such a secretion is probably the substance mentioned by Ainslie as the black lac of the Burma country, with which the natives lacquer various kinds of ware.

The valuable hard black varnish called Japan lacquer is obtained from *Stagmaria verniciflua* of the Indian Archipelago. This resin is extremely acrid and the people of Sumatra consider it dangerous even to sit or sleep beneath the shade of the tree that yields it. The manner of preparing the varnish is fully described in Jack's Malayan Miscellanies.

From the stem of *Holigarna longifolia*, a lofty Indian tree, the natives of Malacca extract an acrid juice which they use as a varnish. The stone of the fruit likewise contains an acrid resinous juice which is employed for the same purpose, while the investing pulp contains a glutinous fluid which is made use of by painters, and for fixing colors on linen.

*Augia Chinensis* produces a varnish which is used in China and Siam. *Odina Wodier*, *Buchanania latifolia* and many more Indian species, yield a juice having the same property.

The fresh juicy bark of *Schinus Arroeira* is used in Brazil for rubbing newly made ropes, which it covers with a very durable bright dark brown varnish.

Mastic, a resin used for varnishing pictures, is obtained by making incisions in the bark of *Pistacia Lentiscus*, a small tree indigenous to Southern Europe and Western Asia. The juice of many species of *Rhus* is milky, stains black, and is sometimes extremely venomous. *R. vernicifera*, a small Japanese tree, yields the famous lacquer so extensively employed by the inhabitants of that country for lacquering various articles of furniture and small ware. It exudes from wounds made in the tree, and is at first a milky juice, but becomes darker and ultimately black on being exposed to the air. There are about twenty different kinds of this lac in the Japanese market. The juice of *R. vernix* and *R. succedaneum* possesses similar properties.

The order Dipteraceæ includes gigantic trees abounding in resinous juice, and found in India and especially in the eastern islands of the Indian Archipelago.

One of these, *Vateria Indica*, furnishes the resin called copal in India (and gum anime in England), and very nearly approaching the true resin of that name. It is also called white dammar and gumanine. In its recent and fluid state it is used in the south of India as a varnish (called piney varnish) for carriages, pictures, etc., and, dissolved by heat in closed vessels, is employed for the same purpose in other parts of India. It is extremely tenacious and solid, but melts at a temperature of 97.5° Fah. The resin is procured by cutting a notch in the tree, so that the juice may flow out and become hardened by exposure to the air. The gum resin known as Brazilian copal is obtained from several species of *Hymenœa* and from *Trachylobium Martianum*; Madagascar copal from *Hymenœa verrucosa*; and Mexican copal from *Elæocarpus copallifera* and *Rhus copallinum*.

*Callitris quadrivalvis*, a coniferous tree of Barbary,

yields the whitish yellow brittle resin known as sandarac, which is used in varnish making.

Kauri resin is a product of *Dammara Australis*, a New Zealand conifer reaching a height of from 150 to 200 feet. The resin is hard and brittle like copal. It exudes chiefly from the lower portions of the trunk, either from natural fissures or from wounds purposely made with an ax. It is at first of about the consistency and color of cream, highly glutinous and flavored like turpentine, but gradually hardens by exposure to the air and changes to a dark color. The best resin is found by digging in the ground where old forests have been destroyed, and it is found from a few inches to as many feet in depth, and in localities now denuded of trees. It is also found in the soil at the base of living trees.

The fine transparent resin used in the manufacture of varnish under the name of damar or dammar is the product of the Amboyna pine, *Dammara Orientalis*, a native of the Moluccas.

*Elæagia utilis*, a lofty cinchonaceous tree of the Cordilleras, is remarkable for the quantity of green resinous or waxy matter secreted by the stipules and which invests the unexpanded buds. The resin is collected by the natives and employed by them to varnish boxes and many other useful or ornamental objects. The natives call this tree by a name signifying wax or varnish tree.

## Herz's Telegraph Invention.

In a recent interview Dr. Cornelius Herz, at present a fugitive from French justice at Bournemouth, England, and who is described as worn with anxiety and pain and clearly dying, declared in broken utterances that he would leave a great invention to be patented and developed. The gist of the invention is an enormous improvement in telegraphy, by which more than 1,000 words can be transmitted by long submarine cables in the same time that 20 words can be sent now. The invention, the doctor claimed, would allow of cabling 50 words at a cost of five cents. He dwelt upon the influence that the invention would have upon the newspaper of the future, and said that he intended, in granting royalties, to reserve all rights as far as they applied to news. The invention, he said, would render submarine telephony and multiplex telephony feasible. Among those engaged in his laboratories in France on the experiments which have resulted in the invention he mentioned Edison's nephew.

## RECENTLY PATENTED INVENTIONS.

## Electrical.

**COMMUTATOR BRUSH HOLDER.**—George J. Junker, Mount Vernon, Ill. This invention provides for the construction of a commutator in which the different coils of the armature may be in series or in parallel, and the current taken off from each coil separately, permitting of supplying as many circuits as there are coils. The commutator is formed of a series of bisected rings mounted on the armature shaft, insulated from each other and from the shaft, with the halves of each ring insulated from each other, and with the terminals of each coil on the armature connected with the halves of one of the commutator rings. The terminals of the coils are all extended parallel with the shaft and insulated from all the commutator rings except the ones to which they properly belong.

## Mechanical.

**NUT LOCK.**—William Woolcock, Shamokin, Pa. This is an improvement in nut locks in which the nut is secured on the bolt by means of a washer, or by a supplemental nut applied to a reduced portion of the bolt. Combined with a bolt having a reduced polygonal extension is a nut having a threaded boss on which a cap nut is adapted to screw, a ratchet being applied to the bolt extension, in connection with a pawl and spring.

## Railway Appliances.

**SAFETY CAR BRAKE.**—Jefferson U. Elwood, McKeesport, Pa. This is a brake especially applicable to street cars, and for use in conjunction with the ordinary brakes. Secured to the car truck are vertically sliding transversely slotted brake shoe holders in brackets, there being wedge-shaped shoes adjustable in the holders. The brakes frictionally engage the track rails, and work on a curve as well as on a straight line. The handle mechanism for working the brake is applied to an ordinary brake shaft, not interfering with the working of the latter.

## Agricultural.

**CORN SHELLER.**—Albert Peterson, Cambridge, Ill. A machine adapted to cut up fodder with corn ears thereon, and then separate the shelled corn from the fodder and cobs, is provided by this inventor. The driving shaft may be turned either by hand or power, and the shelling and separating mechanism are so arranged that it may be used in connection with an ordinary corn cutter, and made to shell corn very rapidly and clean it nicely.

## Miscellaneous.

**WINDMILL.**—Saunders Saundersen, Northwood, North Dakota. This mill is designed to permit the paddles, when the wind blows strongly, to be forced perpendicularly edgewise to the wind, thus spilling sufficient wind to prevent the wheel being revolved

too fast. Should the wind blow very strong, the paddles will be forced edgewise to afford open passage through the wheel, as though the mill were out of gear. By means of a simple mechanism the wheel may be stopped from the ground or its speed slackened. An auxiliary wind wheel is provided at the tail of the mill which automatically acts to carry the main wheel into the wind, should the wind shift.

**SURFACE CONDENSER.**—Albert Hoberrecht, Ensenada, Mexico. A series of steam or fluid condensing tubes is arranged in tiers, according to this invention, air spaces surrounding each tier of tubes held independent of but communicating with each other, an air supply being connected with such spaces, while air tubes are passed through the steam tubes and independent air-supplying means connected with each tier of air tubes. The improvement is adapted for use with stationary, marine, or locomotive engines, and also for condensing spirits in all kinds of distilleries and breweries, operating without the use of water or other agency except air from a stack or artificial draught.

**DRIER FOR COFFEE, GRAIN, ETC.**—Emilio C. y Echeandia, Las Marias, Porto Rico. This apparatus provides for the ready insertion and removal of the material to be dried, the arrangement being such that all the grains will be thoroughly and similarly heated, the drier being designed to work thoroughly and with great rapidity. It comprises a revoluble cylinder having closed ends, a series of communicating circumferential compartments with perforated inner and outer walls, and a heater arranged within the cylinder.

**PLUMB AND LEVEL.**—William Moore, Long Island City, N. Y. This is a tool in which both the plumb and the level tubes may be adjusted simultaneously by the movement of a single screw, the glasses being so set that they will maintain their adjustment for a maximum of time. The plumb and level glasses are so located that the tool may be used conveniently either in plumbing work below or above the operator. The plumb and level glasses are virtually one, but partitions render the plumb and level compartments of the continuous glass independent.

**SASH HOLDER.**—Charles West, Englewood, N. J. This invention relates to sliding sashes such as used on carriage doors, and provides a sash which will not rattle, which will remain in any position to which it may have been adjusted, and which may be used with carriage doors having grooves or guideways of different shapes. The sash has at the sides of its upper portion opposing spring-pressed swiveled leaves, arranged to move yieldingly perpendicular to the plane of the sash, there being guides lower down in the same plane with the leaves.

**GAME COUNTER.**—Charles H. Isburgh, Melrose, Mass. This is a light, cheap and positive indicator for keeping account of the number of points played in games of cards, dominos, etc. It is a permanent attachment to or a portion of a table, and when the score is recorded it is immediately placed before each of the players, the change of score requiring but very simple and slight manipulation.

**CABINET.**—Peter Ulrich, Cedar Rapids, Iowa. This is a cabinet to receive checks, tickets and similar articles, and has a roll front moving in grooves adapted to close its open side, a brake device engaging the movable front and holding it in place wherever it may be fixed.

**TIGHTENING DRUMHEADS, ETC.**—Isaac H. Sapp, Bucyrus, Ohio. According to this improvement a tension band is passed around the head of the drum, banjo or similar instrument, inside the point of its attachment to the body, and a tension device is connected with the band, whereby it may be made to bind more or less firmly against the head. The tightening may thus be effected quickly and conveniently, and the instrument not be bound by the numerous tightening devices usually employed.

**GAME APPARATUS.**—Joel Northrup, Otisville, N. Y. For playing jackstones in a novel manner this inventor has devised a flanged playboard in which is held a removable causeway provided with a series of devices for the reception and passage of the jackstones. The places in the causeway to receive the jackstones are of different forms and the game may be varied by the obstructions, hazards and hindrances placed in the causeway or on the board.

**TOILET PAPER HOLDER.**—William L. Pattani, Alameda, Cal. This inventor provides a case in which the sheets may be held in position for convenient removal, the case when not in use being folded up compactly against any convenient support.

## Designs.

**HAND BAG.**—Henry Bruning, Brooklyn, N. Y. The leading feature of this design consists in a bag body the whole lower end of which is surrounded by an annular band.

**SPOON.**—George P. Tilton, Newburyport, Mass. The bowl of this spoon is divided into a number of lengthwise ranging curved surfaces which follow the longitudinal curves of the bowl and are narrow both at the point and inner end of the bowl.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

## NEW BOOKS AND PUBLICATIONS.

**A MANUAL OF MARINE ENGINEERING.** By A. E. Seaton. London: Charles Griffin & Company, Limited. New York: D. Van Nostrand Company. 1895. Pp. 585. 8vo, 140 illustrations, plates. Price \$6.

This is the twelfth revised and enlarged edition of a standard work. The book was first prepared to supply the want of a treatise on the application of theoretical principles to the design and construction of marine machinery as determined by the experience of leading engineers and carried out in the most recent successful prac-

ture. The data on which the book is based was collected during many years of study and practical work on the part of the eminent author. In 1880, the triple compound engine was little more than a dream, the highest boiler pressure used by advanced engineers was 100 pounds per square inch, steel crank shafts and other heavy forgings were looked upon as luxuries to be indulged in only by governments and wealthy corporations. To-day all these conditions are changed. Most of these changes in engineering practice were gradually introduced, so that it was not difficult by slight emendations and additions to bring the book up to date at each new edition, but other changes have been so rapid as to require the entire remodeling of the book. On the whole, it is one of the most useful books ever written on the subject and has the advantage of being fully up to the best modern practice.

**TRANSACTIONS OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.** Vol. XI. New York: Published by the Institute, 1894. Pp. 938. 8vo, illustrations, plates.

This volume contains a large number of papers with discussion by prominent electricians including William A. Anthony, R. W. Pope, E. J. Houston, Joseph Wetzler, A. E. Kennelly, C. O. Mailloux, Carl Iering, C. P. Steinmetz and others. One of the most interesting and timely articles is that of Isaiah H. Farnham on "Destructive Effect of Electrical Currents on Subterranean Metal Pipes," showing the condition of affairs in Boston. We learn from it that the Omaha plumbers apply the name of "smallpox pipe" to those pipes which are pitted by electrolysis. "The Electric Brake in Practice," by Elmer A. Sperry, is another important paper, while that of Prof. George D. Shepardson on "Suggestions for an Index of Engineering Literature" offers many plans for indexing the vast amount of literature which has appeared on this subject. In the back is a diagram or table called "Diseases of Dynamos," compiled and arranged by Lieut. C. D. Parkhurst. This valuable table should find a place in every dynamo room, as it will tell the probable cause of the trouble from the symptoms shown and gives the remedy. The table is very elaborate and undoubtedly represents an immense amount of labor.

**DER ZUSTAND DER ANTIKEN ATHENSISCHEN BAUWERKE AUF DER BURG UND IN DER STADT.** By Professor Dr. Josef Durm. Berlin: Wilhelm Ernst & Sohn. 1895. Pp. 18. 4to, 18 illustrations.

In our SUPPLEMENT, No. 1021, there is an article on the same subject the present condition of the remains at Athens with special reference to their preservation. Dr. Durm's work, however, is not limited to the Parthenon, but includes other monuments. Dr. Durm is particularly fitted to write on the condition of these buildings by his researches on Renaissance buildings, notably the Cathedral of Florence and St. Peter's Church at Rome, which were embodied in his "Die Domkuppel in Florenz und die Kuppel der Peterskirche in Rom." The excellent sketches in Dr. Durm's work on Athens are calculated to give a clear idea of the present ruinous con-