### SKATE-SAILING.

The home of skate sailing is Norway, the land of fjords, mountains, and lakes.

In order to sail in the Norwegian fashion, two skates one meter (3·28 feet) long and a sail rigged to a long bamboo pole are required. Long skates are necessary, because the enormous lateral pressure of the wind on the sail would otherwise overturn the skater. The sails are made in all conceivable shapes; almost every sportsman has his own particular form, of the efficiency of which he is firmly convinced. Perhaps the most useful type is the one illustrated in the engraving.

The sail-frame is firmly held by the right hand and is directed by a steering cord held in the left hand. A downward pressure of the right hand forces a steel spur at the end of the bamboo pole into the ice, whereby the skater is enabled either to reduce his speed or to stop himself entirely. The sail is simple in construction, but requires no little dexterity in handling.

Skate-sailing is particularly enjoyable on the great fjords of Norway. On the Sognefjord, for example, 100 kilometers (62 miles) can be covered in a comparatively short time, if the wind be favorable. For our illustration we are indebted to Moderne Kunst.

A NORWEGIAN SKATE-SAILOR.

### JAPANESE TORPEDO BOAT DESTROYER.

The accompanying engraving of the new torpedo boat "Ikadsuchi" reminds us of the fact that the Japanese government is very actively at work on the enlargement of its already formidable navy. The photograph was taken by the builders of the vessel, Messrs. Yarrow & Company, of London, at a time when the boat was actually traveling at a speed of over 31 knots, or say about 36 miles per hour, the camera having been used when the "Ikadsuchi" was covering her fastest mile. It will be noticed that she exhibits that tendency to settle at the stern and rise at the bow which characterizes the vessels of this class when they are running at top speed. She is the first of six identical boats which are being built by Yarrow & Company for the Japanese navy.

Her dimensions are: length, 220 feet; beam, 20 feet 6 inches; and draught, 8 feet 6 inches. She is propelled by twin-screw, four-crank, triple-expansion engines, which are balanced on the Yarrow, Schlick, and Tweedy system, which is designed to reduce vibration, and does so very successfully. The high-pressure cylinders are 20½ inches in diameter, the intermediates 31½ inches, and the two low-pressure cylinders 34 inches in diameter, the common stroke being 18 inches. Steam is supplied by four boilers of the Yarrow straight-tube type.

While in general appearance the "Ikadsuchi" is similar to the common type of destroyer, the internal arrangement is modified to the extent that the officers' quarters are placed nearer amidship than is customary in the British destroyers—a modification which will no doubt be highly appreciated by the Japanese officers.

During the trial the contract load of 35 tons was carried, and the high speed of 31 knots was reached without urging the machinery. While the engines were designed for 6,000 horse power, the trial gave evidence that they were capable of a maximum of 7,000 horse power, if it were called for. The steam pressure throughout the trial averaged 185 pounds to the square inch, while the revolutions were 410 per minute. The armament consists of one 3-inch twelve-pounder gun mounted aft and five 6-pounder guns, while two tubes are carried on deck for launching the 18-inch torpedoes carried by this vessel. She stows 90 tons of coal in her bunkers, which is more than sufficient to enable her to cross the Atlantic at cruising speed. It is expected that the official trial trips of these half-dozen vessels will take place during the present year, before the close of which they will probably be on the active list of the Japanese navy.

IT is said that the firm of Kynochs, of Birmingham, England, has begun making 10,000,000 cartridges under an American contract. The cartridges are to be supplied at the rate of 1,000,000 a week.

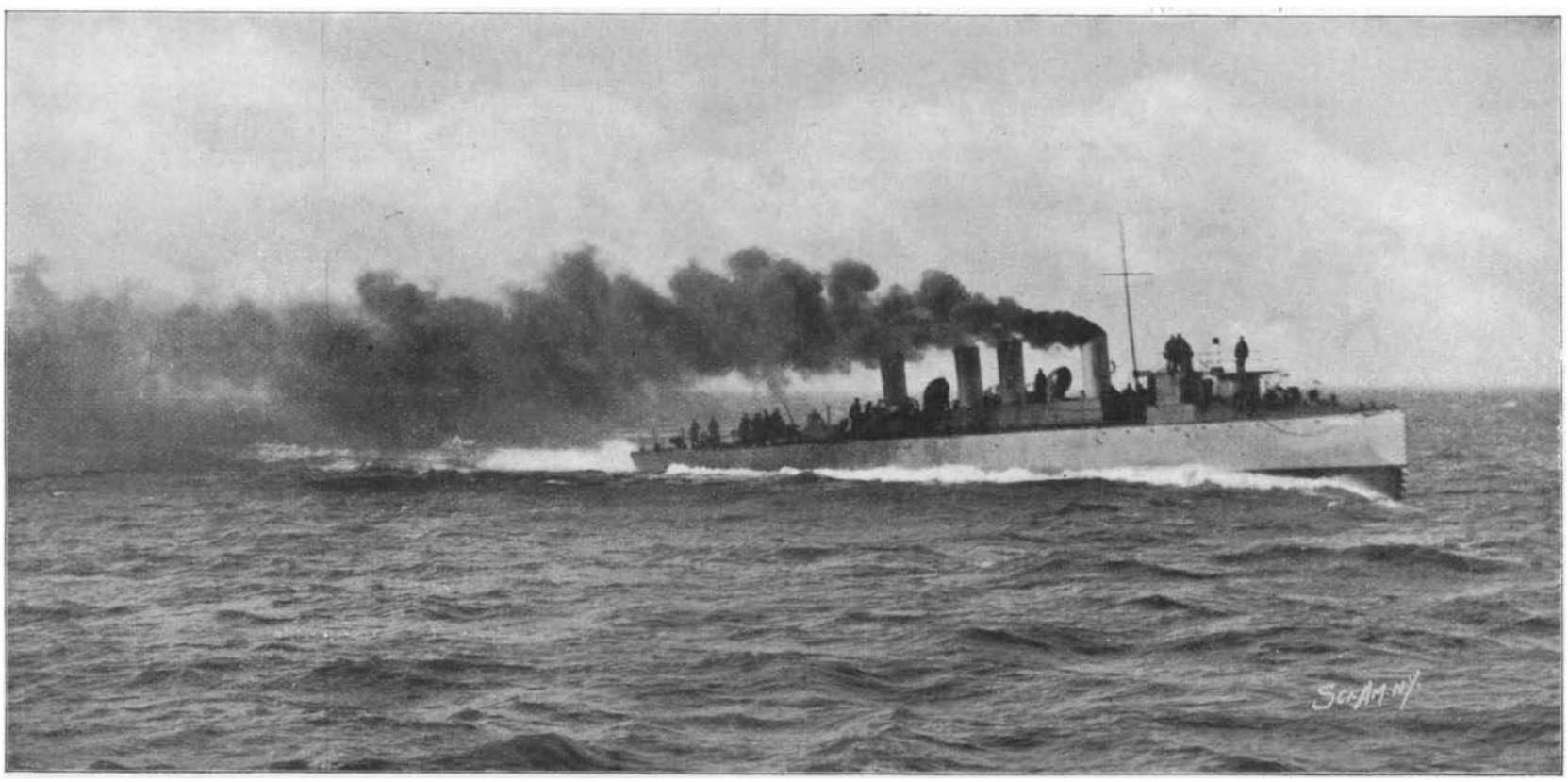
### The Shoreditch Refuse Destructor.

The burning of refuse by the Shoreditch Parish, of London, to supply electricity for lighting streets, dwellings, and public buildings has been the food for considerable discussion in the English electrical press. Before the new plant was in operation the parish had to pay about $30,000 a year for carting the refuse to barges on the Thames and towing it to a dumping place in the sea, and about $20,000 annually was spent for gas for lighting the streets and parish buildings. Sixty thousand dollars was expended for an electrical plant. The funds were obtained by taxing the people. The plant ran all the time during week days and twelve hours on Sunday, furnishing electric power for small manufacturers during the day and for illuminating purposes at night. The street sweepings have furnished all the fuel necessary, only $432 being expended for coal. The total expenditures for the first year were $19,070 for wages, supplies, insurance, repairs, etc. The interest, sinking fund, rents, depreciation, etc., was $10,205, making a total of $29,275. The gross receipts for the sale of light and power, including a credit equal to the average charge for street lighting by gas, was $45,205, thus leaving a net profit of $15,930. This will be used in enlarging the plant. Of course, by street sweepings must be understood cinders, manufacturing wastes, etc.

### Automobiles in Paris.

Consul-General Gowdy in his annual report states that during the past year there has been a marked increase in the adoption of automobiles, not only as pleasure vehicles owned by private individuals, but in the way of cabs serving the public for hire and for business purposes in the way of delivery wagons, specially those for long distances. It is announced that at the beginning of the next year there are to be one hundred motor cabs driven by electrical power running in the streets of Paris, and if the experiment is successful, the cabs will be increased to one thousand. With this project in view a large plot of ground has been acquired, where the building of works necessary for the housing of cabs and machinery for electrical supply is being rapidly completed. We have already referred to the training ground for cabmen. The automobiles which use petroleum products are objected to by the public by reason of their odor, noise, and vibration.

THE lead keel of the new cup defender was finished January 28, and has been set up on the marine railway where the boat will be built. It is finely polished. The keel is fitted with bronze bolts and as soon as the framework arrives the new boat will begin to take definite form. Two of the bronze plates have arrived, and more are expected the next week. Work has already been started on the sails of the new boat. Later in the season the mainsail will be cut, and the town hall of Bristol, R. I., will be used for the purpose.



THE NEW JAPANESE DESTROYER "IKADSUCHI," MAKING 31 KNOTS ON HER TRIAL TRIP.

### Miscellaneous Notes and Receipts.

**New Process of Hardening Steel.**—Formerly the hardening of steel was connected with difficulties, inasmuch as cracks appeared in the steel. To obviate this evil, the following process has been adopted, according to Neueste Erfindungen und Erfahrungen: The steel is, as usual, coated with a solution of whiting and varnish, heated to cherry heat, and dipped for a few seconds in acidulated water. Next, it is, for about double the length of time, dipped in rape oil and finally laid in a moderately cooling bath, such as rock oil or water mixed with whiting. By dipping the steel first, for a short time, in water, the heat is drawn away from the outer layer, so that this layer becomes hard. If it were left in the water until completely cooled, the inside core would cool off just as quickly, thus rendering a cracking inevitable. But the fact that the steel is left in the water for a few minutes only, and is then dipped in rape oil, causes a retarding of the cooling in the interior, although the outer layer also loses a little of its original hardness thereby. To restore the latter, the steel is finally placed in a moderately cooling bath. By merely cooling it in oil, it would not attain a sufficient hardness.

**To Clean Mirrors.**—Take a soft sponge, well washed out and cleaned of all sandy particles, dip it in water, squeeze it out again, then dip it in spirit of wine, rub the glass with it, sprinkle on fine whiting through muslin, and rub the glass again vigorously with a silk cloth. If the mirror is very large, treat only one-half at first, otherwise the spirit of wine dries before it can be rubbed off. If the frame is not varnished, care must be taken that it remains perfectly dry and is not touched with the sponge, because this would injure the gloss or discolor the gilding. The frames can, by the way, be cleaned of dust and dirt without hurting the gilding by rubbing with cotton wool. If they are well varnished, rub them with alcohol. This will remove the stains and produce a nice polish. No cloth should ever be employed for dusting off and cleaning such frames.

The following process, given by Liebhaberkünste, is also conducive to good results: Take pure grain brandy and grind with it on a grinding stone, or if this is not at hand, in a glass mortar, linden or willow ashes which have been filtered through linen until all sandy particles have disappeared; then dilute the ashes with more alcohol and pour it off again after about one hour. With this decanted substance, which contains the finest particles of the ashes, the looking glasses are rubbed down and polished. The mirrors can also be given a handsome luster by rubbing with tin ashes and washing with a piece of soft hat felt.—Allgemeine Tischler Zeitung.

**New Process for Producing Polish.**—For many years there has been a vain effort, especially in the piano industry, to obviate the ugly exudations of oil on polished articles. The fact that no success has been attained so far is explained by the circumstance that the erroneous opinion was clung to that the oil employed in polishing was causing the eruption. Latterly it has been found out that this effiorescence is due to the vegetable wax contained in large quantities in the shellac. This vegetable wax enters into an intimate combination with the oil in polishing and forms a soft, greasy substance which prevents the polish from hardening properly; it is, therefore, very sensitive to change of temperature, as well as shock and friction. The said soft, greasy mass exudes, after a shorter or longer term, as an oily effiorescence.

The evil, therefore, can only be fully obviated by abstracting from the shellac used for polishing the entire amount of vegetable wax contained therein.

According to a German process, this is accomplished by agitating a strong alcoholic shellac solution with fresh stick lac or seed lac or filtering on this lac. Thereby the readily soluble resin, as well as slight quantities of coloring matter contained in the fresh lac, are abstracted from it, while the more slight soluble vegetable wax is separated from the solution. By one or repeated treatments of the concentrated shellac solution with fresh seed lac a clear alcoholic solution free from wax of the shellac resins is obtained, which is not practicable by simultaneously dissolving the shellac and seed lac in a quantity of alcohol sufficient for a complete solution. (Compare Ande's "Die Technischen Vollendungsarbeiten der Holzindustrie," second edition, 1888, page 168.)

Such a shellac resin solution freed from vegetable wax has heretofore not been employed as a furniture polish and would not be suitable for this purpose, as it is too "short" and not pliant enough to admit of being readily and uniformly rubbed into the wood.

For obviating this difficulty, a medium is added to the shellac solution separated from the vegetable wax which fully takes the place of the wax as regards pliancy and polishing qualities without exhibiting its unfavorable after-effects.

Such a medium has been found in the essential oils, especially in oil of rosemary.

The production of the new polish is, for instance, as follows: Dissolve 20 kilos of shellac and 4 kilos of gum benzoin in as little spirit (95 to 96 per cent) as possible, with addition of 1 kilo of oil of rosemary. The concentrated solution obtained is now repeatedly filtered over fresh stick lac until the vegetable wax contained in the solution is completely abstracted and the solution has become entirely clear.—Färben Zeitung.

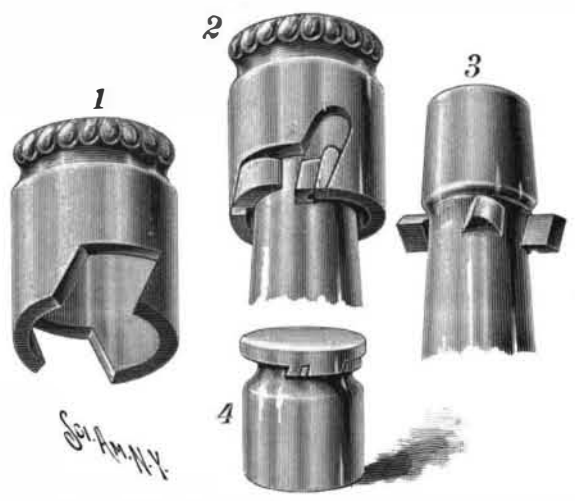
### A NON-REFILLABLE BOTTLE.

An improved bottle and jar closure has been invented by Alfred Braverman, Fresno, Cal., which is designed to prevent the adulteration of the liquid contained in a vessel or the refilling of a bottle.

Fig. 1 is a perspective view of a cap employed; Fig. 2 represents a modified form of the cap applied to a bottle; Fig. 3 is a perspective view of the neck of a bottle, and Fig. 4 shows the invention applied to a jar.

The closure as illustrated in Fig. 1 consists of a cap having diametrically opposite, depending, segmental portions. Extending outwardly from the neck of the bottle and diametrically opposite each other, are sealing-lugs and stop-lugs (Fig. 3). One end wall of each of the depending portions is designed to engage with a sealing-lug and the other end wall with a stop-lug. The stop-lug prevents the cap from rotating while the sealing-material is drying. In the construction shown in Fig. 2, a wedge of glass is employed, which is forced between a sealing-lug and the adjacent wall of the depending portion of the closure. To facilitate the entrance of the wedge, the closure is provided with an upwardly extending opening.

The bottle, after having been filled, is corked in the usual way. A cement is then applied to the surface of the sealing-lugs and the cap placed over the bottle-neck. In the modification shown in Fig. 2 the wedge is coated on both sides with cement and is then inserted. After the cement has hardened, the bottle can be opened only by rotating the cap toward the sealing-lugs and away from the stop-lugs. This operation will break the sealing-lugs away from the bottle-neck, leaving but a very slight and narrow projection, which will not cut the fingers.




BRAVERMAN'S NON-REFILLABLE BOTTLE.

### The Sanitation of Public Places of Amusement and Churches.

The hygienic arrangement of theaters and other places of amusement all the world over is disgracefully neglected, says an editorial in The Medical Record. The importance of thorough sanitation of schools and similar institutions is now fully realized, and no expense and trouble is grudged in carefully looking after the bodily as well as the mental welfare of the young. It is, therefore, curious that, while adults are so solicitous for a state of sanitary soundness in schools, they should exhibit a complete indifference toward hygienic matters in theaters, music halls, and churches. One reason for this apparent disregard for the laws of health is that the stay in such places is necessarily brief. Nevertheless there are signs that the general public are becoming more alive to the dangers lurking in theaters and churches. The less said about the toilet rooms of theaters, both for the use of the public and employés, the better. The ventilation of public places has received very elaborate attention in some places, but in the older theaters and churches the means for ventilating them are either non-existent or antiquated. So long as playgoers are indifferent, the managers and theater owners will allow matters to remain in statu quo. Theater proprietors are not the only sinners in this respect, for churches of all denominations are in many instances overcrowded and insufficiently ventilated. In churches where services are held at frequent intervals, special means should be taken to provide a sufficient allowance of pure air by mechanical process for ventilation.

A SPECIAL flag for the Coast and Geodetic Survey vessels was used for the first time in launching the "Pathfinder," at Elizabethport, on December 7, 1898. The flag has a blue field carrying a white circle with a red triangle in it.

### Science Notes.

S. H. Cavendish, explorer, and Edward Dodson, the naturalist, have gone to Patagonia to search for the giant ground sloth, or megatherium.

Some of the principal carbon interests in the United States will shortly be consolidated in a new organization to be known as the National Carbon Company, with a capitalization of $10,000,000.

The achievements of the American inventor Mr. Eddy are rivaled by the automatic photograph apparatus which has been used for balloon ascensions with such satisfactory results by L. Grilletet, who has been working under the financial encouragement of Prince Albert of Monaco.

Prof. Moissan states, in the Comptes Rendus, that when calcium carbide is perfectly pure, in which condition he has recently prepared it by reducing pure calcium hydride in a bed of pure amorphous carbon, it is quite white and forms white scales which are seen to be transparent when viewed through a lens. The presence of the least trace of iron is sufficient to color them. The brownish color of the commercial calcium carbide is due to the presence of this metal.

It is announced that the cupola of the great church of Sacre Cœur, at Montmartre, Paris, will be completed by the year 1900. Two-thirds of the work is now finished and the summit of the cupola will be reached some time this year. The dome will be surmounted by a stone cross. Five or six months will be spent on the interior decoration of the church after the scaffolding has been removed. The church is very dark at present, but will be properly lighted as soon as the glass is put in the dome. The campanile, the sacristy, and the presbytery will still require about three years' work. The work was commenced in June, 1875, and has cost about $5,000.000 to date; its completion will require another $1,000,000.

A curious method of replacing the roof of a stand pipe was resorted to by the Waterworks Department at Napoleon, O. In a violent wind storm the roof was blown off, together with the upper part of the ladder leading to the top. The water was withdrawn from the stand pipe, and a raft was built inside; then the water was turned on and the raft, laden with workmen and their utensils, was gradually sent upward at the rate of twenty-five feet per hour. It required five hours to make the ascent. Hooks and pulleys were then attached to the pipe, and material was drawn up on the outside, while the men performed their work, using the raft for a platform. A raft has been used before in constructing such things as large water tanks.

Great improvements are projected in Florence which, if they are carried out, will assist to ruin this beautiful city for American and English visitors, who care for it only for its collections and its associations. Some of the last demolitions have aroused widespread anxiety in both England and America, and the result has been that a petition has been circulated by a society which has been organized to defend the Florentine monuments. The project has undoubtedly been downed for the time being, as the petition contained the signatures of officers of all of the art societies in America and England, nearly all of the college presidents and faculties, art writers, and those generally interested in the preservation of things Italian. It seems strange that the municipality of Florence should be so dead to their own interests that it is necessary to work through the cupidity of the hotelkeepers and shopkeepers of Florence, but this is the case. Of course, the old cry of sanitary reasons is advanced, but not on very good grounds.

In Calcutta, India, where an extensive system of sewers are being built, collapsible centers are being used. They are of various sizes, but all are constructed in the same manner. In brief, they consist of a central shaft, having a right-hand screw thread cut upon it from one end to the center and a left-hand thread from the other end to the center. Hand wheels are mounted upon the ends. The screw is mounted upon a framing, which also supports four broad rollers used in shifting the position of the apparatus. On the screw are several nuts provided with vertical arms and with two vertical and two horizontal arms. The outer ends of the upper and lower arms are hinged to channel irons, each pair forming a toggle, with the nuts forming the center. This arrangement allows of the channels being forced apart or closed up like a parallel ruler, according as the central screw is turned one way or the other. Hinged to the top channel are two side plates bent to the right curvature and braced with small angle irons. The lower half of the sewer is built of brick concrete in advance of the arch; the center is rolled into place and the hand wheel turned until the channels and side plates are extended to the proper size, and the rollers are lifted free of the bottom. The arch is then built in the usual way. When sufficiently set, the center is contracted by turning the screw in the reverse direction until the center is free and the rollers are in contact with the bottom. It is then run forward to the next section. The advantages of such a system are self-evident.