

The Steamship Scotia.

Many of our people, from having frequently crossed the Atlantic in the steamship Scotia, the last side-wheel steamer built for the Cunard Company, will be glad to know what has become of their favorite vessel. A foreign contemporary gives the following account of her:

"Few would recognize in the large twin screw steamer which left the Mersey lately, the once famous Cunard liner Scotia, the last of the great paddle steamers built for the Atlantic trade, and which, under the command of the late Captain Judkins, was for years looked upon as the fastest and favorite vessel on the line between Liverpool and New York. The Scotia was built in 1862, when, with the exception of the Great Eastern, she was probably the largest mail steamer afloat, being about 400 feet long over all, 47 feet 8 inches beam, and 4,050 tons builder's measurement, and fitted with a pair of side lever engines of 1,000 horse power. The introduction of screw steamers fitted with compound engines for the Atlantic and other ocean voyages has, of late years, entirely superseded the paddle steamers, and a few years back the Scotia was withdrawn from the Cunard Company's sailing list, and was subsequently purchased by the Telegraph Construction and Maintenance Company to be employed in their cable-laying operations. Extensive alterations were made by Messrs. Laird Brothers, at Birkenhead Ironworks. The Scotia has been stripped of her masts, funnels, machinery, paddle wheels and paddle boxes, deckhouses, etc.; she has also been raised by the addition of a spar deck, and altered about the after end to prepare her for twin screws, and has been fitted with new compound engines, and also provided with three immense cylindrical tanks in which to stow the electric cable, as well as with most elaborate and approved steam machinery for paying out and hauling in, also steam capstan, steam steering gear, winches, etc. The new engines are two distinct sets, on the compound system, with inverted cylinders, 38 inches, and 66 inches diameter, and 3 feet 9 inches stroke, supplied with steam at 75 lb. pressure from three double-ended cylindrical boilers, and are calculated to drive the vessel at a speed of about 11½ knots an hour

THE ELECTRIC PEN.

Our engraving, which we take from *La Nature*, represents a new electric pen devised by Messrs. Bellet & Hallez d'Arros, who deserve credit for having remedied several imperfections which existed in the first instruments made on this principle.

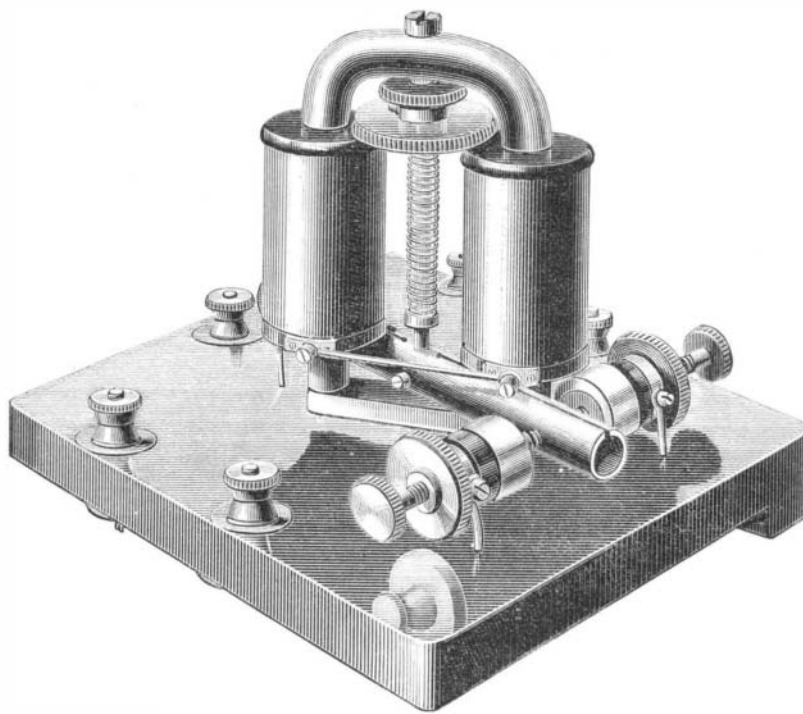
This pen was suggested by the familiar experiment of piercing a card by the passage of an electric spark from a Leyden jar. The spark of an electric machine or an induction coil passing between metallic points or between a point and a conducting body is capable of piercing a card, and will, of course, much easier puncture a sheet of paper. When the sheet of paper rests upon a metallic plate and the surface is traversed by the electric pen, the plate and the pen being connected with the poles of an induction coil, a line may be produced by a series of very fine perforations, which will vary in number in a given space with the rapidity of the discharges and the rate of the movement of the pen. The principle of the pen is very simple, but before the practical utilization of it was reached, many difficulties had to be surmounted. Among these we may mention the tendency of the sparks to burst forth, when the pen is within a short distance of the paper, puncturing the paper in all directions, making it impossible to draw a clear line from the start. The operator was also liable to severe shocks. Another difficulty was the distance between the successive perforations. These imperfections have been overcome by Messrs. Bellet & Arros, by reducing

the strength of the secondary current, so that it has only sufficient power to pierce the paper, and will not, therefore, give a perceptible shock. The paper which is to form the stencil is dipped in a solution of salt and dried; this operation prevents too many sparks from issuing from the pen, and insures an absolutely true and clear line. The interrupter is of novel form and is operated by the magnetized core of the induction coil. The apparatus forms a desk of me-

dium dimensions. At one side of the desk there is a plunging bichromate battery; the induction coil is placed in the middle and is connected by one of its wires with the lead of an ordinary lead pencil, which serves the double purpose of making a visible mark on the paper and of conducting the current. The metallic plate which supports the paper is also connected with the coil and is secured to the desk top. When it is desired to take an impression from the stencil it is placed over a sheet of paper, and rolled with printer's ink reduced with a little printer's varnish or with castor oil.

A NEW SOUNDER.

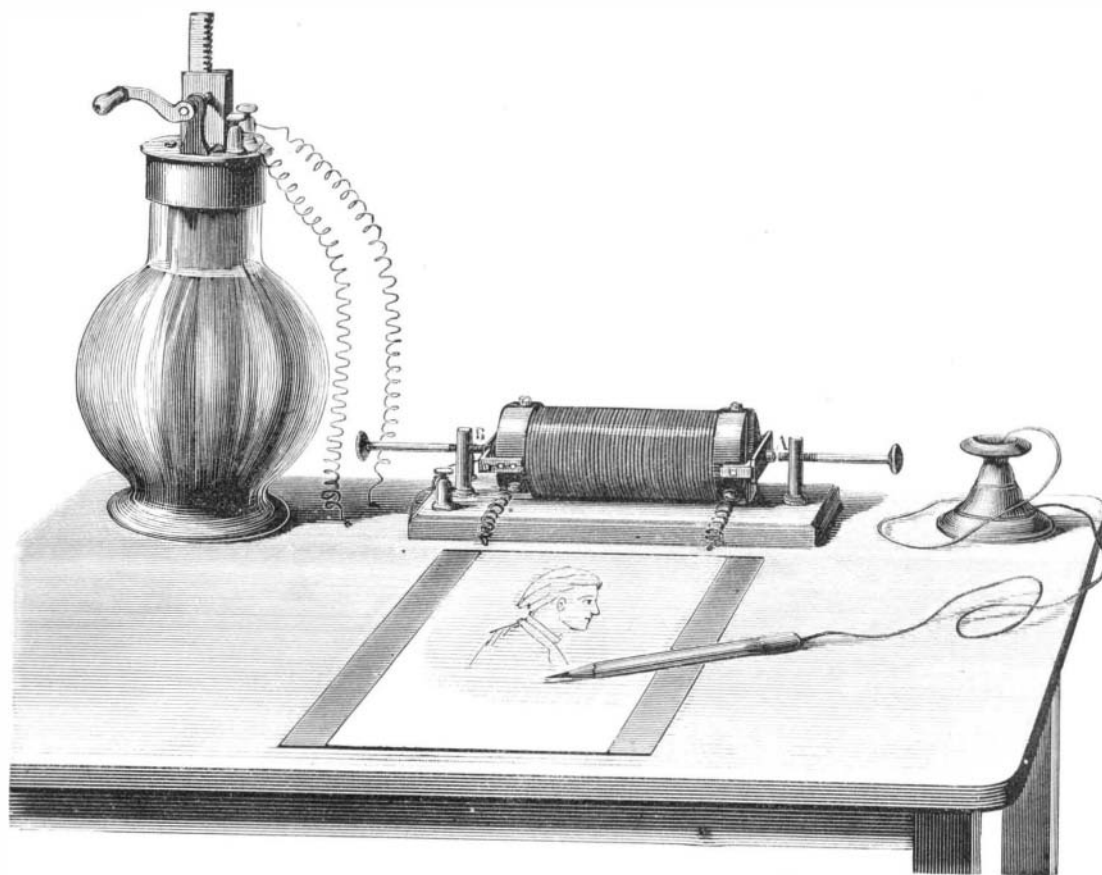
The accompanying illustration represents a sounder for direct working or translation, and of which over one hun-

**A NEW FORM OF SOUNDER.**

dred have been constructed for the telegraph lines in India.

It differs from an ordinary sounder in the arrangement of the armature, which is supported by a vertical spiral spring. This spring serves to restore the position of the armature when the current ceases, as well as to relieve the lower bearing of nearly all friction. The prolongation of the armature acts as the beam, and plays between the two stops shown in the engraving.

To insure very good insulation for damp climates, the coils are rendered solid by repeated immersions in a compound of resin and beeswax (for hot climates, ten parts of resin and

**NEW ELECTRIC PEN.**

one of wax answers well). The range of the instrument is shown by its working without fresh adjustment, either with one Daniell's cell through 6,000 ohms or with 20 through 0. When very delicately adjusted, one Daniell's cell through 31,000 ohms is just able to work the instrument if the stops be extremely close together. —G. Dubern, in *Journal of the Society of Telegraph Engineers.*

NEW AGRICULTURAL INVENTIONS.

An improvement in the class of churns having a reciprocating dasher which is operated by a spring motor, has been patented by Mr. W. L. Allegru, of Hebbardsville, Ky. This improvement relates to the construction of the churn cover, which is composed of two separate disks, the lower one being designed for gathering the butter.

An improved churn dasher, constructed so as to give the milk a continuous rotary motion as the dasher is moved up and down, has been patented by Mr. Seth K. Warren, of Louisville, Ky. The invention consists in wings eccentrically pivoted to arms attached to the dasher handle.

A cultivator that is constructed so that its teeth may be elevated or depressed at will, so that it may be hauled or drawn over the road on its own wheels, has been patented by Mr. Wm. Jones, of Mill Point, N. Y. It will cultivate or make a furrow close to a fence or hedge.

An improved machine for stacking and rickling hay and straw has been patented by Mr. B. E. Jones, of Boonville, Mo. The invention consists in a combination of devices which cannot be readily described without an engraving.

Mr. A. W. Meyer, of Labadie, Mo., has devised an improved straw elevator for thrashers and separators, which consists in the combination of a fan blower, a pivoted screen held in a horizontal position by a weighted arm, and a conductor spout, with a stacker having cross slots in its floor.

An improved sulky scraper, constructed so that it may be readily adjusted to the various positions required for collecting, carrying, and dumping the load by the driver from his seat, has been patented by Mr. William C. Marr, of Onawa, La.

Mr. James M. Matthews, of Knoxville, Tenn., has patented an improved plow, which has a semicircular iron beam upon which the mould board is made adjustable.

Mr. Sam. T. Ferguson, of Minneapolis, Minn., has patented an improvement in horse rakes, which consists in a yielding or flexible lever, which may be held by the hand of the driver, and which may be readily changed to

a rigid lock lever which will hold the teeth of the rake to the ground without the aid of the driver.

The Fur on the Tongue.

The nature of the fur on the tongue has been the subject of a study by Henry T. Butlin, F.R.C.S., and the results of his investigation are given in a paper read at a recent meeting of the Royal Society. The author finds that tongue fur consists chiefly of (1) debris of food and bubbles of mucus and saliva, (2) epithelium, (3) masses which at first appear to consist of granular matter, but which are the glæa of certain forms of schistomycetous fungi. In order to ascertain the true nature of the glæa, and to obtain it in a purer form, it was cultivated upon a warm stage. Several fungi were discovered, but only two of these were present in every instance, *Micrococcus* and *Bacillus subtilis*, and as the glæa produced artificially was similar to that existing naturally in the tongue fur, it is believed the fur is composed essentially of these two fungi.

Micrococcus developed freely and abundantly, forming large masses of yellow or brownish yellow color. *Bacillus* did not develop, but existed in greater or less abundance in all the cases examined. It appeared to be identical with the *Leptothrix buccalis* described by Robin. Although it did not develop under artificial conditions, it is probable that development takes place freely upon the surface of the tongue. Its habitual occurrence there, and the presence of spore-bearing filaments, favor this view. Besides these fungi there were present in more or less abundance, *Bacterium termo*, *Sarcina ventriculi*, *Spirochaeta plicatilis*, and a larger form of *Spirillum* or *Vibrio*. The first of these fungi existed in some of the furs, and twice developed with great rapidity. The second was frequently present, and generally developed quickly, forming large masses of a yellow or yellowish brown color. The *Spirochaeta* occurred in only two or three of the specimens examined.

The slime between and around the teeth was found to consist of the same fungi as the tongue fur, but the rods of *Bacillus* were longer, probably owing to fewer disturbances.