sprinkling and raking operation. This second bleaching turns the wax almost to a snow white, and it is ready to be formed into cakes for the market.

About 600 pounds is then melted up at a time in a tub and drawn off to be made into cakes as needed. These cakes are made by running melted wax from a horizontal movable copper cylinder into circular moulds. These moulds are of heavy tin, 4 inches in diameter and about one-quarter inch in depth, and are placed one after another on a long table, the sides of which are fitted up with tracks, over which the movable cylinder can be drawn back and forth. This cylinder is 10 inches in diameter, 5 feet in length, and double. The outer cylinder contains hot water, which surrounds the inner one, containing about fifteen pounds of melted wax. The hot water and wax are poured into the cylinders by means of capped tubes at each end. Projecting from the outside of cylinder and connecting with the inner cylinder are a number of small hollow tubes, through which, when the attendant turns the cylinder over, the wax runs out into the moulds. As soon as the moulds are filled the cylinder is drawn back again and pushed forward to the next set of moulds, the operation being repeated until the moulds are all filled. To keep the wax from cooling, the hot water is poured when cool, and fresh added after every ninety pounds of wax has been drawn off. The moulded wax becomes cool in about one hour, and it is packed into boxes and ready for market. The sketches were taken from the plant of Theodor Leonhard, Paterson, N. J.

Mysterious Fires.

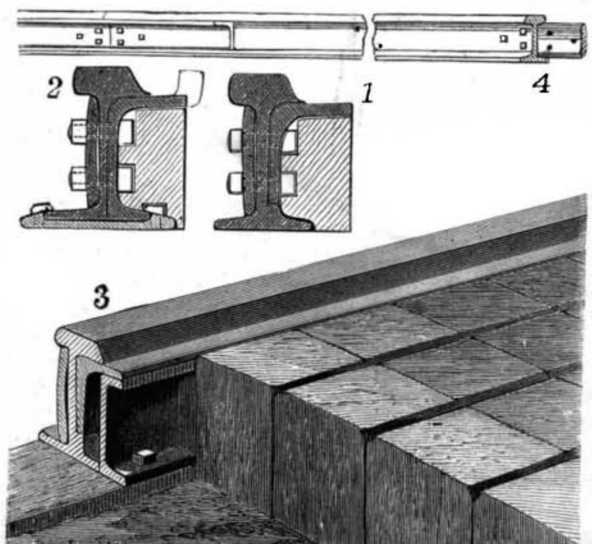
During a recent visit to a country hotel which was lighted by incandescent lamps, Professor John Trowbridge relates that a thunderstorm occurred, and he noticed that the lamps blinked at every discharge of lightning, although the interval which elapsed between the blinking and the peals of thunder showed that the storm was somewhat remote. The effect was doubtless due to induction, produced by the surging of the lightning discharges. On the occasion of a heavy discharge, the lamps were extinguished, although no fuse was burned. This provided an opportunity for an attendant to discover that a jet of gas from a pinhole leakage in the gas fixtures had become ignited (doubtless by a minute electric spark) and the flame was impinging upon some adjacent woodwork. The discovery averted what would have been, perhaps, a serious and mysterious conflagration. The moral of the story is, of course, to be found in the reflection that had the electric light wires not been carried along the gas fixtures, as they were in this case, the ignition would probably not have occurred. This practice is fraught with danger, for if there is a leakage of gas (and what gas fixtures do not leak?) at the joints of the pipes or through a sandhole or other flaw in the casting, then tiny electric sparks arising through resonance effects or from the passage to earth of an electric charge brought into the building by the wires may, if they happen to form in contiguity to the leak, readily ignite the escaping gas without being discovered in time to prevent disaster. If people will cling to their gas when they lay down an electric lighting system, then it behooves the electrical engineer who superintends the work to see that the wires and the pipes are never contiguous, for no lighting guard or protector yet invented can insure that minute sparks, due in some cases to resonance effects, may not arise.—*The Electric Review.*

Water Tank Painting.

"What is the best method of preparing a new steel tank for painting?" and "How should the scale and rust be removed from a common iron tank?" Mr. A. I. Horton, of the Michigan Central Railroad, said, at the recent meeting of the Car and Locomotive Painters' Association, that in preparing iron for tanks it should be rolled and rerolled in the boiler shop before being made up. After the tank is completed it should first be rubbed with sandstone and kerosene, and afterward washed with soft soap and water. Steam should then be turned inside and the tank heated until no moisture appears in the pores or under the scales, and until the lead or paint smokes. As soon as sufficiently cooled it should be puttied and painted. This process gives excellent satisfaction. Mr. Horton also said he had never been troubled with scale on steel tanks as on iron. Mr. F. W. Wright said that the rust could be removed from both steel and iron tanks by rubbing with broken fragments of emery wheel, then with sandstone, and afterward washing with turpentine, when the tank would be ready for puttying and priming.

A RAILROAD RAIL FOR STREET RAILWAYS.

The illustration represents an improved form of rail for street railways, composed of track or running rails proper and supplementary rails bolted to the track rails, and having a laterally projecting top portion serving as a wheel guard and lateral brace for the track rails. The improvement has been patented by Mr. Michael J. Keenan, of Galveston, Tex. Fig. 1 is a cross-sectional view of the preferred form of construction, in which a flange rail is bolted to the inside of the track rail, the lower edge of such flange rail being



KEENAN'S RAILROAD RAIL.

seated on a shoulder formed on the inner side of the web of the main rail, while its flange portion rests on the usual block forming part of the pavement. In Fig. 2 is shown a modified form of the improvement, the lower portion of the flange rail being in this case formed with a base constituting a continuation of the flange of the main track rail, while at curves in the road the flange may have a guard extension, as shown in dotted lines. Fig. 3 shows another form of construction, in which the outer edge of the flange rail is supported on an angle iron running parallel with the track rail, and connected with the adjacent blocks of the pavement. Fig. 4 is a reduced side view of the improvement. The main track rail breaks joints with the flange rails, so that the flange of the car wheel travels on the flange rails when the tread of the wheel passes over the joint between two main track rails.

German Otto of Roses.

The rose plantations established two years ago in the suburbs of Leipzig have been so successful that they have been largely extended. The trees have withstood the severe weather of the recent winters and developed most satisfactorily. It is stated that great heat is objectionable in the culture, a cool temperature and a somewhat moist condition of the atmosphere being the chief conditions of a good yield. A factory has been built in the midst of the rose fields which will consume 50,000 kilos. of leaves daily, and is expected to produce as a minimum about 40 kilos. of essential oil, the estimated value of which, together with that of the rose water and pomade produced, will be from £2,000 to £2,500. Only the requisite quantity of flowers for immediate use will be gathered at any one time, and the roses will be but a few minutes in passing from the trees into the macerating receptacles. It is claimed that the oil produced in Saxony last year was better than the Turkish product, in delicacy, strength, and the lasting character of its perfume.—*Kew Bulletin.*

DELCROIX'S TOPOGRAPHIC RULE.

The campaign topographic rule that we propose to describe appears to us to be destined to render great services. This instrument, which was devised by Captain Delcroix, solves problems relative to a knowledge of the ground, in form and in position, to the study of nature itself, and to the construction and reading of maps. With it, it is possible to lay out a rapid itinerary or an expedite plan, or make a picturesque sketch by the aid of an elementary perspective picture. Six ordinary scales give the reduction of the lengths. A gradient scale permits of rapidly expressing the ordinary gradients. Employed advantageously for the estimation of distances of firing and of lengths of such a nature as the vertical and horizontal stadimeter, the rule permits through a simple observation of measuring a vertical or horizontal angle, or both simultaneously. The topographic rule thus commends itself to travelers, engineers, all those who indulge in open air sports, lovers of sketching and making interesting observations, explorers and members of societies of gun practice, gymnastics, military instruction, bicycling and nautical sports. It will be seen that its uses are numerous.

The apparatus is formed of two juxtaposed instruments, the topographic rule and the protractor compass (Fig. 1). It consists of a flat rule with beveled edges upon which are engraved two triple scales, giving scales multiples of one another. Upon the rear edge, which also is beveled, is engraved the scale of gradients for the equidistance of a quarter of a millimeter of the staff office map and of topographical maps in general, and that too for ordinary gradients of from a half to ten hundredths. Into the front part of the rule is set a spherical level. Finally, upon the long axis are arranged a sighting screen and a back sight.

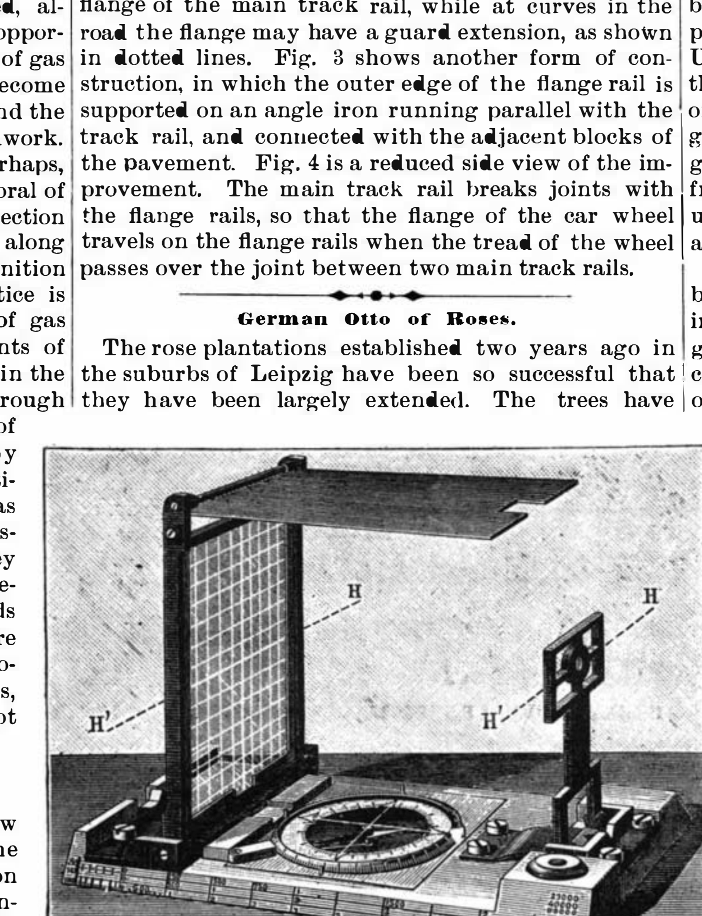


Fig. 1.—DELCROIX'S TOPOGRAPHIC RULE.

A protractor compass with rectifiable limb, placed between two transparent glasses, is set, axis upon axis, into the rule. It is graduated by preference into grades or centesimal degrees, in order to facilitate calculations. Upon the upper glass are traced two arrows of alignment at right angles. Four small datum columns keep the axes at right angles and permit of the variable orientation of the limb. The compass needle may be rendered immovable in any position whatever in order to mark the angles. The compass is easily removed from its receptacle, so as to be employed alone. Upon the long axis of the rule, and in front, is arranged an ocular pinule provided with a hinge so that it can be turned down. The variable color of the eyes and the luminous point of the eye may lead to errors of observation. So in the center of the ocular there has been substituted for the human eyeball a copper one, slightly smaller and containing a visual aperture. The visual ray is thus well centered and the sighting assured. At a distance of 100 millimeters from the pinule and parallel with its plane is suspended in a frame a perpendicular translucent mirror of platinized glass, divided into millimeter squares, and upon which are marked two axes at right angles, and so arranged that the horizontal axis of the mirror and that of the pinule form a plane exactly parallel with the lower plane of the rule. The divisions are read to the right and left of the mirror. The vertical frame, being provided with a hinge and rack, can be turned down and made to assume various inclinations. Fig. 2 shows the method of using the apparatus for an ordinary observation, and Fig. 3 for observation by reflection. A light screen of blackened brass serves to shut off the vertical luminous rays, and to protect the glass during carriage.

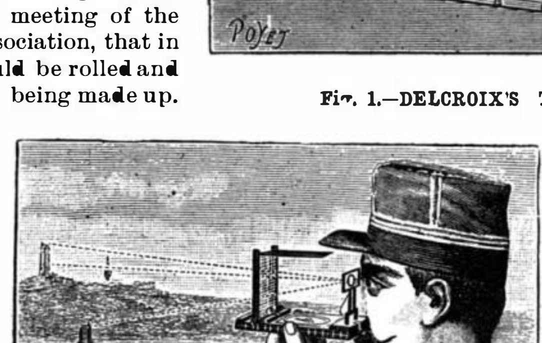


Fig. 2.—NORMAL OBSERVATION.

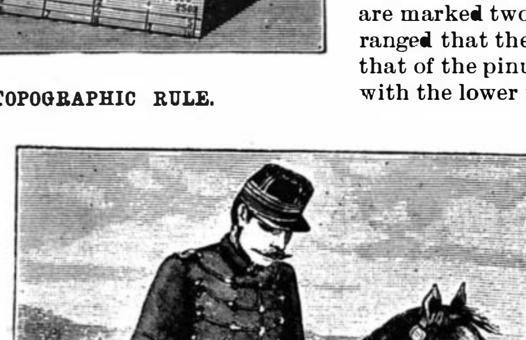


Fig. 3.—OBSERVATION BY REFLECTION.

With this apparatus it is possible to perform the following operations: Measure horizontal angles and lay off distances; measure vertical angles and differences of level; vertical and horizontal stadimetry; picturesque sketching; and reduction of angles to the horizon.—*La Nature.*