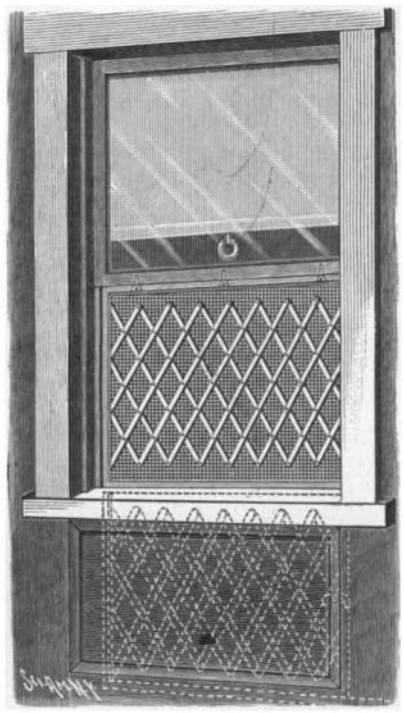
NOVEL WINDOW-GUARD AND FLY-SCREEN.

The subject of the illustration presented herewith is a guard which can be applied to any vertically-sliding window, which is attached to and moves with the lower sash, and which is so constructed that it can be readily opened whenever it may be desired. The primary purpose of the guard is to provide means for preventing children from falling out of the window. The device



COMBINED WINDOW-GUARD AND FLY-SCREEN.

is the invention of Harry Levy, 1289 Second Avenue, Manhattan, New York city.

In the construction of the window-guard lazy-tongs are employed, carried by a frame which is screwed to the lower sash. The sill of the window is provided with a slot communicating with an opening into which the lazy-tongs and their frame can pass when the window is closed.

It is evident that when the lower sash is raised the lazy-tongs guard is likewise raised to cover the open space, and that, when the sash is lowered, the guard is likewise lowered, as the dotted lines of our engraving show. When the guard is in its uppermost position, the lower bar completely fills the slot, so as to prevent the accumulation of dust.

Most window-guards are defective, in so far as no means are provided for removing the guard in case of fire. The objection has been very simply overcome in the device under consideration. The lazy-tongs are pivoted to one side-bar of their frame, and are adapted to be secured to the other side-bar by means of a hook and keeper. By releasing the hook, the lazy-tongs can be folded together so as to leave an unobstructed passage. The construction, therefore, does not interfere with the closing of the shutters.

In connection with the guard, a fly-screen is employed, which is attached to the upper and lower bars of the lazy-tongs frame. The fly-screen is constructed so that it can be readily raised and lowered independently of the sash, and is provided with a catch engaging the upper bar of the guard-frame, by means of which catch it is held in raised position. The fly-screen and guard can be used either separately or together. The device is also applicable to the windows of high-speed railway trains.

The Work of the United States Forester.

The Division of Forestry of the Department of Agriculture accomplishes each year most valuable work. During the last fiscal year practical and paying forestry has been successfully introduced on two tracts of land of a total area of 108,000 acres, and it has now entered its second year under greatly improved circumstances, while the preparation of working plans for conservative lumbering has been in progress with a view to more than twice that acreage. Important modifications and practical methods of lumbering have been suggested by the division, and introduced by private owners on a large scale with marked success, although more than 400,000 acres have come under the care of the agents of the division with a view to the practical introduction of improved methods. The total requests for such work to date have exceeded 1,600,000 acres. Forest fires have been studied historically, and practically at some length, in eight states in the field, and results of importance have been reached. A plan for systematic contributions to the knowledge of North American forests has been devised and has already yielded very valuable results. A system for a photographic forest description of the United States has been worked out and the collection is well under way. The division is in close and fruitful co-operation with the forest work of the United States Geological Survey. The technical assistants under the supervision of the heads of sections are of various grades. The first grade is that of "collaborators." This grade is filled by experts of established reputation in forestry, lumbering or tree-planting. They are scattered throughout the country, and their function is to prepare and forward for publication treatises on subjects previously agreed upon. There are now eight of these gentlemen, and the Forester is certainly correct in saying that they will be able to prepare authoritative statements of great value at very moderate cost, for the pay of a collaborator is only $300 per annum. The grade of "student assistant" is an important one, and only those are selected who desire to adopt forestry as their profession, and the demand for places very largely exceeds the number of positions which can be offered. The practical experience which they gain is in no sense intended to replace thorough training at forestry schools. There are twenty-eight of these assistants and they receive $25 per month as pay.

Photographing Upon Marble.

The following process for making photographic impressions upon marble has recently appeared and is said to give very fine results. The surface of the marble is well smoothed but not polished. Upon this is spread a layer of the following mixture: Benzine, 500 grammes; turpentine, 500 grammes; bitumen, 50 grammes; beeswax, 5 grammes. This layer is allowed to dry, and the gelatine surface of the photographic plate is then applied and an exposure of 20 minutes made by sunlight. After removing the plate, wash with gasoline, which takes off that part of the varnish which has not been acted upon by the light, and the image gradually appears. The action of the gasoline is stopped at the desired point by washing in a stream of water. The surface thus prepared is plunged into an alcoholic solution of Prussian blue, eosine red, etc. When the color has penetrated by capillary action, the layer of varnish is taken off and the surface of the marble finely polished. In this way a permanent image of a fine color and great depth is obtained.

LORD KELVIN'S ELECTRIC TROLLEY RAIL TESTER.

The services of Lord Kelvin to electrical science have been as great in the industrial world as they have in the classroom, and an exhibit of the various apparatus which has been designed by him would be positively voluminous. We present an illustration of the Kelvin rail-tester which is used to determine whether there are any defects in the conductivity of the rails of an overhead trolley system. The track rails perform the important part of carrying the return current, and it is necessary, not merely to give these rails and their joints a high conductivity at the time of the construction of the track, but also to test them, from time to time for defects. In our illustration the tester is shown as being applied at a joint in the rails in the endeavor to detect a faulty bond. The instrument consists of a graduated bar, upon which are two sliding steel contacts, which are provided with terminals and are connected by means of a flexible wire to the terminals of

ELECTRIC TROLLEY RAIL-TESTER.

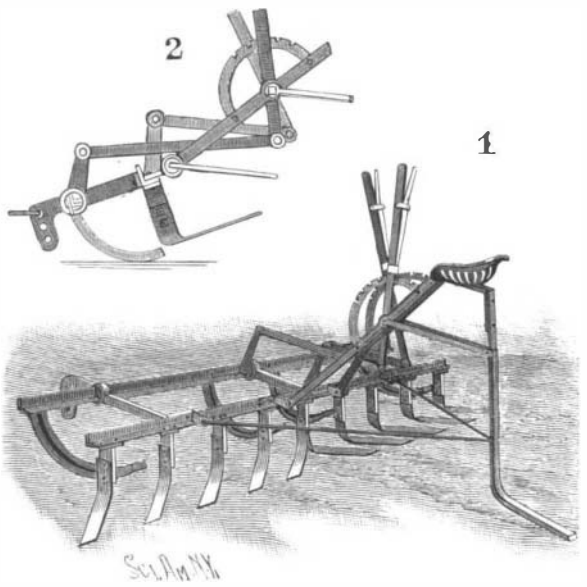
a low-range voltmeter carried in a case which, for convenience, is strapped around the shoulders of the operator. When the lid of the case is opened it forms a desk on which are two paper clips that serve to hold the test sheet. The contact bar is provided with a suitable handle by which the apparatus is placed across the bond in the manner shown in the illustration. The resistance of the rail is indicated directly by the instrument in the case. Various degrees of sensibility may be obtained by altering the positions of the contacts on the bar. For our illustration we are indebted to The Electrician.

A NEW FORM OF WEEDING-MACHINE.

A simple and light weeding machine has been devised by Frank S. Gunning, of The Dalles, Ore., which is so constructed that the depth to which the weeding-knives enter the ground can be readily determined and controlled, even while the machine is in operation.

The frame of the machine consists of a front adjustable portion and a rear, main portion.

The front adjustable portion consists of a forward



GUNNINGS'S WEEDING-MACHINE.

bar adjustably supported by a rear bar. Weeding-knives are carried by the rear bar. Curved runners are attached to the forward bar. These runners determine the depth to which the weeding-knives shall enter the ground, and likewise serve as forward bearings for the machine when it is to be taken to or from the field.

The main frame comprises side bars pivoted to the rear bar of the forward frame and connected with a central drag-bar by means of braces. The side bars have quadrants secured between them, which coact with the thumb-latches of two levers. Of these levers one controls the front bar of the forward frame, so that the bar in question can be turned in its sockets as occasion may require, and the other is connected with the rear bar of the forward frame, so that the entire forward frame can be raised or lowered.

Through the medium of the first lever the runners can be carried up or down the required distance, and through the medium of the second lever the entire front section of the frame can be raised or lowered so as to elevate or depress the weeding-blades.

Early Methods of Food Preservation.

Dr. S. Rideal recently published a paper before the Society of Arts, in which he gave some very interesting information regarding the methods used to preserve food in ancient and modern times. He stated there were only a few early allusions to the use of salt, vinegar and allied substances to keep food from putrefying, and none of them were of much importance.

It was not until the middle of the nineteenth century that is was discovered that small quantities of certain antiseptics would enable the original qualities to be retained and prevent the decay for a considerable period with less influence upon the digestive organs, than the old curing processes.

Recently compressed oxygen and sterilized air have been tried for preserving milk and butter. When the latter is kept in carbon dioxide at a pressure of 6 atmospheres it often remains unchanged for four or five weeks. It has been found, however, ineffective to prevent changes in milk or meat. It has been found also that the sterilizing effect of carbonic acid in mineral waters is not as great as has been thought. Dr. Otto Hahner has examined many mineral waters and found them swarming with bacteria.

The Krupp Iron Works.

The total number of people employed by Krupp is at present 41,750, of which 25,133 are at Essen, 3,458 are in the Gruson Steel Works at Magdeburg-Buckau, and at 2,726 at the German shipyards at Kiel and 10,344 in various smelting establishments and coal mines owned by Krupp. The foundation of these gigantic works was laid in 1810 by the grandfather of the head of the present firm. Essen was then a small town of 4,000 inhabitants; it now has 105,528 inhabitants. The firm owns a large number of iron mines, including the great Bilbao mine in Spain. The ore from the latter is taken to the seacoast by a railroad owned by the firm, and from there it is conveyed to Rotterdam by four of their own steamers. The testing ground for guns is at Meppen and it has a target range of 72,000 feet. In 1892 the great Gruson steel works at Buckau were purchased and three years ago shipbuilding yards were started at Kiel. When they are completed 7,000 men will be employed at this place.