The Luster of Metals.

Dove was the first to attempt an investigation of the causes of metallic luster. He had examined, by the aid of a stereoscope, two images of a pyramid, one being colored blue and the other yellow, expecting to find a relief image of a green color. He was, however, astonished to find that the mixture of colors gave a reflection like that of a polished metallic surface. Having repeated the experiment, using a black and a white image, he obtained the metallic gray of lead and tin. Dove concluded that metallic luster is due to two reflections from superposed surfaces, and that the accommodation of the eye being different for each color, a perfect coincidence of the images of different colors was impossible. The luster of metals would thus be caused by a reflection from the actual surface and another from beneath the surface. This explanation attributes a considerable degree of transparence to the metals, more indeed than seems consistent with fact. Brücke offered another theory, according to which the color of light reflected from bodies not possessing the metallic luster should be independent of the local color—that is, the color of the reflecting body—while in the case of metals the color of the reflected light is that attributed to the substance, the incident light being white. Brücke also considered that a certain intensity of reflection was a necessary condition for metallic luster, this intensity resulting from the opacity of the metals, and he mentions the phenomenon of total reflection as producing a perfect imitation of metallic luster. The theories of Dove and Brücke represent opposing views of the transparency of the metals; the one considers them as opaque, the other as transparent. Herr W. Spring (*Bul. Soc. Chim.*, 50, 219) endeavors to reconcile these views by a study of the nature of the surfaces of the solids he has obtained during his experiments on the compression of solids within polished steel cylinders. He finds that substances which in the form of powder are opaque produce solids that have a metallic luster, whatever the nature of the substance, while such substances as yield powders more or less transparent formed cylinders having vitreous surfaces, looking as if varnished.

The Deadly Wire.

Recently an electric wire carrying a powerful current of the subtile and mysterious force fell across Bourbon Street, near the theater of the French opera, at a time when many people were passing. It happened that a mule which was drawing a street car came in connection with this wire, and was at once stricken down by the deadly electricity and killed on the spot. The unfortunate mule was in some sense a sacrifice to save the lives of men and women, some of whom, but for the warning given, might, in all probability, have stumbled upon the fatal wire with a like result.

The electric wire has introduced a new element of menace to human life and to the security of property that seems scarcely to have come into the purview of law makers, who are charged with legislation for the protection of life and property. The industrial uses to which electricity is being put are constantly increasing, and scarcely a week passes without additional wires being erected to conduct the force which has been wrongly termed a fluid. Every such wire is a new danger—an additional thread from which to suspend a sword of Damocles over the heads of the people.

As to laws for their protection, there seems to be none. True, a general law exists which would make an electric light company liable for damage caused by wrongful or criminal negligence on their part, but so little is known of electricity as a practical industrial force motor, save by a few experts, that it would be extremely difficult in court, in a claim for damage, to establish undue or wrongful negligence on the part of an electrical company. Let us inquire a little. The wires are suspended from wooden poles over the streets of the city. Are the wires securely placed? What constitutes security in the premises? The wooden pole readily rots; it may be broken by the enormous weight of the wires it carries, and such a result is extremely likely when a great network of wires so suspended is violently and forcibly vibrated by the wind. There appear to be no restrictions as to the number of wires strung upon a pole. Almost every day additions are made to those already there. Then as to the methods of fastening the wires to the poles—the main thing considered is to insulate the wire from electrical communication with the posts. The fastenings may be deemed secure by those who use them. The fact is, however, that the wires frequently fall into the streets, with fatal consequences to the people at large, not to the corporations who own them. They may suffer temporary delay of business.—*N. O. Picayune.*

AN IMPROVED FIRE ESCAPE.

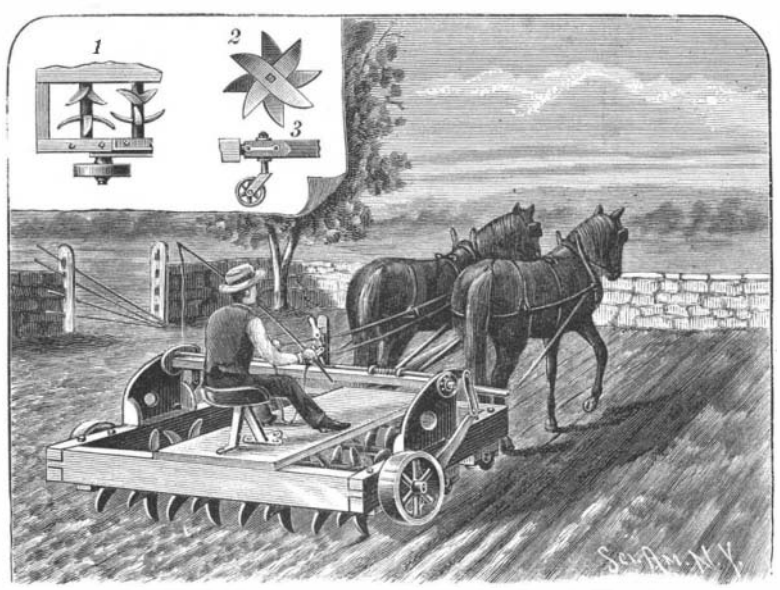
A simple form of fire escape, which can be readily made available from any window of a house, and with which the speed of descent can be readily regulated by the person descending, is illustrated herewith, and has been patented by Mr. Joseph Abbott, of Rumney, N. H. It is made with two forked arms, pivoted at their forked ends, and each having a snap hook at its free end, the fork of one arm extending within that of the other. Around the pivotal bolt, as shown in the small views, a rope may be wound one or more times, and is

ABBOTT'S FIRE ESCAPE.

thence extended down between jaws made by the arms, which are drawn closely upon it by a spiral spring connecting the two arms. The upper end of the rope has a hook by which it is to be secured to a window sill or other part of the building, while the lower end is dropped to the ground. A hanger, or strap, in which the person descending is to be seated, has rings at its ends, to be connected with the arms by hitching upon the snap hooks, both ends of the strap passing through a metallic adjusting ring, before being connected with the arms, the speed of the descent being then regulated by moving the adjusting rings up or down, whereby greater or less brake pressure is put upon the rope. An extra strap is supplied to be passed under the arms, when desired, and attached similarly to the snap hook. The device is furnished to weigh less than three pounds, and only 10½ inches in length.

AN IMPROVED SOD CUTTER AND HARROW.

An apparatus for effectively breaking up sod or ground, and wherein the cutters may be regulated to any desired depth, or the apparatus may be carried from field to field without the cutters touching the ground, is illustrated herewith, and has been patented by Mr. Abraham Madson, of Galesville, Wis. Within



MADSON'S SOD CUTTER AND PULVERIZING HARROW.

aligning hangers attached to the under face of the frame side pieces are journaled transverse shafts, polygonal a greater portion of their length, upon which are fixed the knives or cutters, Fig. 2 being a transverse section through one of the cutter shafts, while Fig. 1 is a partial plan view at the ends of two of the cutter shafts. Each set of cutters consists of two knives mounted in such manner that one knife will be at right angles to the other, forming a cross. The several shafts carrying the cutters are so journaled that the curved surface of the blades mounted upon one shaft will be contiguous to the surface of the equivalent blade of the next shaft, whereby the entire surface of the ground traversed by the apparatus will be pulverized. A lever is pivoted centrally to each side bar of the frame, on the lower end of which the drive wheels of the apparatus are studded, the other ends of the levers projecting diagonally upward parallel with the outer face of brackets attached to the upper surface of the side bars. In the brackets a transverse rock shaft is journaled, having near each end an arm pivotally connected by a link with the upper extremities of the levers on which the drive wheels are studded. A standard is secured centrally on this rock shaft, with a hand lever fulcrumed in its top, whereby the lever carrying the operating wheels may be raised or lowered, to regulate the depth of cut or lift the cutters from the ground. The rock shaft is held in the position desired by means of rods passing through apertures in the arms at the ends of the shaft, each rod also passing through one of a series of apertures in the bracket around the bearings of the rock shaft, these rods being automatically projected by a spring on each. The shaft hinged to the forward end of the frame has an adjustably secured caster wheel.

Miscellaneous Notes.

The Eiffel Tower in Paris had reached a height of 761 feet on January 9, 1889—the highest structure upon the globe.

Standard Time.—All the railroads in the United States and Canada, without exception, now use the standard time of one of the four sections—eastern, central, mountain, or Pacific. Cities and towns have very generally conformed to railroad time of their respective sections. Out of 288 cities of over 10,000 inhabitants, less than 25 still retain local time.

Force of the Wind.—The high wind of Saturday night, January 5, blew the car cable out of the sheaves on the Brooklyn bridge, stopping travel for a short time.

Work of Flowing Artesian Wells.—At the Ponce de Leon Hotel, St. Augustine, Florida, an artesian well furnishes power through a turbine and dynamo for lighting the building and grounds by electricity.

At Yankton, Dakota, a flowing well drives the dynamos of an electric lighting company, the water flowing to a reservoir, from which a turbine is actuated.

African Railways.—It is proposed, by a new company just formed in Brussels, to build a railroad to connect the head of navigation on the lower Congo with Stanley Pool, thus opening up a line of about 7,000 miles in the interior of Africa to trade and commerce.

Trade Schools.—By the munificent gift of Mr. I. V. Williamson of stocks of a market value of $2,250,000, a "Free School of Mechanical Trades" is to be erected and organized near Philadelphia.

The Pratt Institute of Trades and Art, Brooklyn, N. Y., opened the year with 1,000 pupils.

Cloth and Paper of Corn Husks.

One of the best utilized waste products in Austria, resulting in the manufacture of large quantities of paper and cloth, are corn husks. The *Evening Telegram* condenses from a foreign publication the process for separating the fiber. The husks are boiled with an alkali in tubular boilers, as a result of which the fibers of the husks are found at the bottom of the boiler in a spongy condition, filled with a glutinous substance, and which proves to be a perfect dough of corn meal, containing in a concentrated form all the pabulum originally contained in the husk. The glutinous matter is pressed out from the fibers by hydraulic apparatus, leaving the fiber in the shape of a mass or chain of longitudinal threads interspersed with a dense mass of short fiber. The linen made from the long fibers furnishes a very good substitute for the coarser kinds of flax and hemp, and is superior to jute, gunny cloth, coir, and the like.

The paper, for which mostly the short fibers are used—the long fibers constituting the material for spinning—is stronger than papers of the same weight made from linen or cotton rags, its hardness and firmness of grain exceeding that of the best dipped English drawing papers, being especially adapted for pencil drawing, stenographic writing, and water colors. Its durability exceeds, it is claimed, that of paper made from any other material, and the corn husk parchment is not at exposed points destroyed by insects. If the gluten is left in the pulp, the paper can be made extremely transparent without sacrificing any portion of its strength. Again, the fiber is easily worked, either alone or in combination with rags, into the finest writing or printing papers. It also readily takes any tint or color, and can be worked almost to as much advantage into stout wrapping papers of superior quality as into fine note and envelope papers.