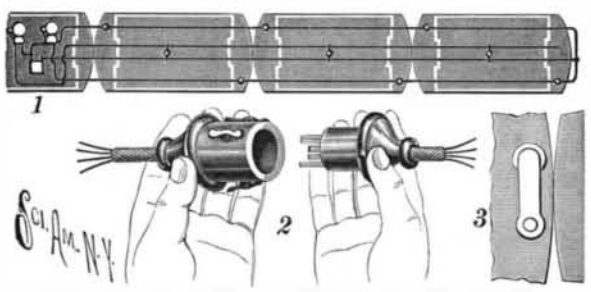
ELECTRIC TRAIN "STOPPING" AND "STARTING" SIGNAL.

The illustration represents a very simple system of signaling to the engineer from any part of a train, each conductor contributing his part to the closing of the circuit, and the signal being given the moment the last conductor completes the closing of the entire circuit. The improvement is represented as arranged especially for use on elevated railway trains, insuring promptness in leaving stations. A patent has been granted for this invention to Francis C. E. von Sternberg, of No. 933 Lafayette Avenue, Brooklyn, N. Y. In Fig. 1 are indicated three cars of a train and the

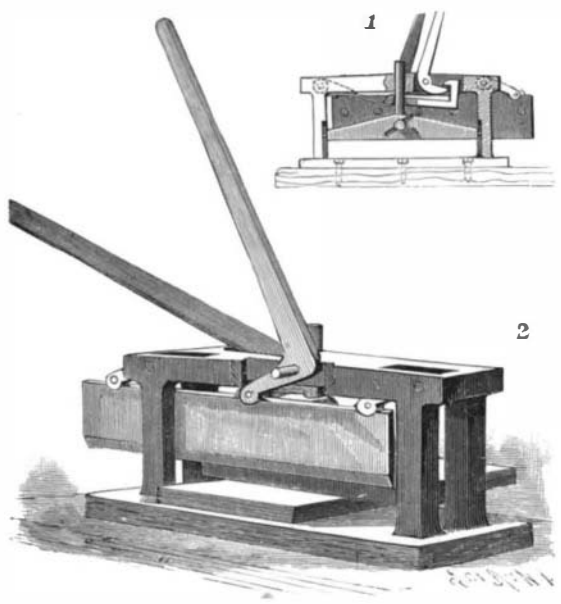


VON STERNBERG'S ELECTRIC TRAIN SIGNAL.

engine, there being in the cab two electric bells and a battery, connected up with the train wires to form "starting" and "stopping" circuits. The starting circuit includes two parallel conductors extending the length of the train at each side, each wire being provided with a circuit closer on each car to hold the circuit normally open, such circuit closers being at opposite sides of the platforms at opposite ends of the cars, and the ends of the conductors being connected with a central return conductor at the rear of the train, whereby each branch of the starting circuit is maintained normally open. The stopping circuit includes a central conductor extending along the train and having normally open connections with the return conductor on each car, there being in each car circuit closers to close the stopping circuit and operate the signal. To connect the sections of the several circuit wires, a coupling device, such as shown in Fig. 2, is employed, and on the first and last platform, where no gateman is usually stationed, the circuit closers are made in the form of a push button adapted to be held depressed by a pivoted button, as shown in Fig. 3, the circuit being thus held closed at all times on the first and last platforms. When the passengers have passed off or on the train, each guard, on closing the gates, presses the circuit closer on the side of the train next the platform, and the starting signal in the locomotive is sounded when the last circuit closer or push button has been pressed, the stopping signal being similarly sounded by operating either of the circuit closers in the train in the stopping circuit. The entire system is extremely simple, affording but the minimum of chance of its derangement or getting out of order.

A PAPER AND PASTEBOARD CUTTER.

A simple and inexpensive cutter, readily operated by hand, and designed to be well adapted for the use



BYRD'S PAPER AND PASTEBOARD CUTTER.

of country printers, is shown in the accompanying illustration, and has been patented by Charles A. Byrd, of Drain, Oregon. Fig. 1 is a side view of the machine, with the parts adjusted to receive the paper to be cut, Fig. 2 being a partly sectional view of the opposite side of the cutter, showing the paper-clamping device. The presser arm and block are engaged and operated by a lever having a cam-shaped end to firmly clamp any thickness of material, from a single sheet to the greatest thickness within the range of the device; and when the stock has been clamped the movement of the knife lever effects a drawing cut by the blade. As the main portions of the machine may be made of cast metal at a low cost, a cutter of this description can be afforded at a very moderate price.

The Carl Zeiss Optical Works.

The Carl Zeiss Optical Works at Jena are probably the most important of their kind in the world and are quite exceptional in their constitution. The firm was established some years ago by a skilled workman whose name it bears. He is no longer living, neither is any member of his family connected with the factory. Jena is a university city in Saxe-Weimar-Eisenach, one of the Thuringian states of the German Empire. When Zeiss began to make his way he found the necessity of the association of some scientific adviser, and was fortunate enough to obtain in that capacity the well known Professor Abbe. In consequence of the rule that only the very best possible work should leave the factory, the business grew with great rapidity.

This institution is now a public trust, with the Duke of Saxe-Weimar as chairman. By public trust it must not be supposed that a public company in the ordinary sense is meant, for the profits annually earned, which are large, do not benefit individuals in the sense of shareholders. The payment of wages to the ordinary staff is liberal, the scientific staff receiving no less a sum than $25,000 annually. In this division is still included Professor Abbe, with whom is associated Dr. Czapski, as advisers in the optical department, and Dr. Pulfrich in a like capacity on instruments for physical research, while Dr. Rudolph advises on photographic objectives; Mr. Fischer being general business manager. To return to the question of the profits, they are divided between old age pensions for the workmen and grants for the encouragement of scientific research. The University of Jena receives a portion of these latter grants and more than one Englishman has participated, if not actually in money, in the form of scientific instruments. The invested pension fund now exceeds $1,250,000.

Some idea of the magnitude of the Carl Zeiss Works may be gathered from the fact that it requires three hours to pass through the various wings and departments, without leaving much leisure for inspection of details. Upward of 500 workpeople are employed, a curious feature being that there is no difficulty in obtaining skilled workers in metals, but the optical hands have to be trained within the works from boyhood. In consequence of the frequent addition of extra rooms to the factory difficulty in transmitting the power from a central steam engine was from time to time increasing, the loss of power being more than forty per cent. This difficulty has been overcome by making the steam engines drive large electric dynamos, which are connected to separate motors under each workman's bench. The loss has thus been reduced to eighteen per cent.—Science Gossip.

The Electrical Production of Carbon.

It has been recently shown, says the London Electrician, that at the highest temperature attainable in an electric furnace, all substances other than carbon are dissipated and removed, with the result that the ends of the electrodes are not only graphitic, but are also sensibly pure. It follows that a carbon plate or rod, of dense graphitic structure, good conductivity and unusual freedom from impurity, should be producible by exposing the ordinary moulded article to the temperature of the electric furnace. This is precisely the direction in which Messrs. Street and Girard have been working. They claim to have succeeded in producing a form of carbon the conductivity of which is fourfold that of the untreated material, while its resistance to chemical action is also much enhanced. Taking the density of an ordinary carbon before heating as 1·98, they find that after treatment it has attained a density of 2·6. Should this figure be corroborated, it must be considered remarkable, inasmuch as the density of graphite obtained by ordinary means is not higher than 2·3, while the same figure has been observed as a maximum for hard gas carbon. Analysis of the carbons thus made indicated that the percentage of carbon transformed into graphite was about 80 to 85 per cent. The method of analysis is, however, by no means beyond criticism, depending, as it does, on the conversion of the graphite into the highly indefinite body known on the lucus a non lucendo principle as graphitic acid, which in no way resembles graphite, or comports itself as an acid. This point, however, may safely be left for future settlement. The precise percentage of graphite is not of moment, provided a product has been obtained possessing many of the properties that would be exhibited by a sound coherent block of that form of carbon. When once criticism is allayed by the appearance, in a marketable form, of carbon which is nearly free from other elements than C and neither oxidizes easily nor irregularly, nor breaks up when used as an anode for aqueous or igneous electrolysis, an ample field of application will at once be open. To take one of the most pressing cases alone; it is notorious that next to the want of a good diaphragm, the most urgent need of those interested in commercial electrolysis has been a reliable, unattackable anode.

GATTI'S PRYING BAR FOR HANDLING LUMBER.

The illustration represents a tool more especially designed for the use of stevedores in loading vessels with lumber. It has been patented by Tony C. Gatti, of Scranton, Miss. It consists of a bar of steel having at one end a curved point and serrated back, to give a good hold on the lumber and prevent slipping, while at the other end is a stop in the form of a chisel point terminating in a collar, preventing the stop from passing too far into the lumber. The stop is employed to stop the timber passing through the port into the vessel, by placing the opposite point of the tool against one log and engaging with the stop the incoming log, the collar preventing the stop from entering the timber more than about two and a half inches, instead of five or six inches, as is frequently the case with stops without a collar.

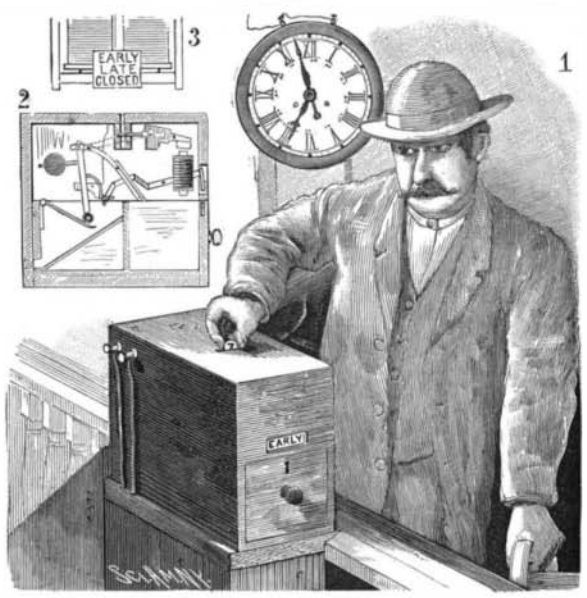
Man's Susceptibility to Weather.

Who has not felt the difference between a depressing and an exhilarating day? Sydney Smith wrote: "Very high and very low temperature establish all human sympathy and relations. It is impossible to feel affection above 78 degrees or below 20 degrees." Dr. Farr and Dr. Stark almost lead us to think morality is registered on the thermometer, so surely does it measure certain kinds of criminality. On suicides the effects of the weather are well known. Nearly all vocations are affected by weather. Men of science are often as much subject to weather as seamen. Some writers must have the weather fit the mood, character or scene. If one will read poetry attentively, he will be surprised to find how many weather marks are scattered through it. Diverse weather states may be one cause of so much diversity and even disagreement in thought processes usually regarded as scientific. Many experienced teachers think there should be modifications of school work and discipline to correspond with the weather.

The head of a factory employing three thousand workmen has said: "We reckon that a disagreeable day yields about ten per cent less work than a delightful day, and we thus have to count this as a factor in our profit and loss account." These are some of the ideas put forth in a preliminary statement by J. S. Lemon, who proposes to publish more at length upon the subject. "Laboratory investigation of the subject," he says, "meets at the outset the difficulty of distinguishing results of weather changes from similar states otherwise caused. This difficulty is no greater than in many other topics of research, and, we believe, will not invalidate our methods and results."—Popular Science Monthly.

AN ELECTRIC TIME CHECK RECEIVER.

The illustration represents an automatic device for receiving the checks or tickets of employes in manu-



JARDINE'S ELECTRIC TIME CHECK RECEIVER.

facturing establishments, offices, etc., for which a patent has been granted to Charles K. Jardine, of Achuaran, Lismore, Oban, Scotland. The lower part of a box, of which a transverse section is shown in Fig. 2, has a drawer divided by a partition into two compartments, one of which has an inclined chute leading to a slot in the lower part of the drawer at the rear. In the top of the box is a time-check-receiving slot, beneath which is pivoted a lever, there being a plate attached to the lower end of the lever, while to its rearwardly curved upper end is pivoted a bar, at whose lower end is a roller, there being also in the bar a rod on which is a counterweight. An electro-magnet