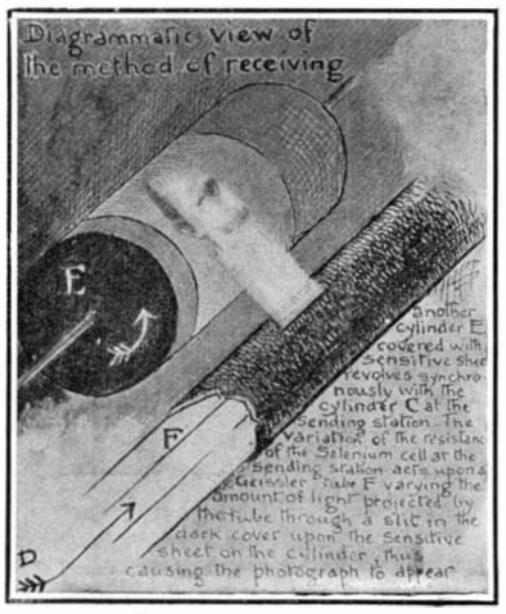
## KORN'S PHOTOGRAPHIC FAC-SIMILE TELEGRAPH.*

BY ROBERT GRIMSHAW.

The following information was obtained in an interview with Prof. Korn, of Munich, the inventor of one of the latest systems of electro-telephotography, or of reproducing electrically, at a distance, photographic images.

As far back as 1901 the professor made more or less successful experiments in transmitting electrical-




**The Receiver of 1903.**

D. Wire from transmitter; F, Geissler tube; E, cylinder with film for receiving the image.

ly to a distance, simple figures and signs, by means of specially-constructed sending and receiving apparatus. The picture to be transmitted was placed in a glass cylinder which was constantly rotated and also simultaneously moved in the axial direction, and which was illuminated by light rays passing through a small opening in a metal casing surrounding the glass cylinder. The source of light was a Nernst incandescent lamp, the rays from which were totally deflected by a prism on to a selenium cell, which has the property of changing its electrical conductivity under the action of light rays of varying intensity. The more strongly the cell is illuminated, the greater becomes its electric conductivity, and *vice versa*. In the receiving apparatus, which was electrically connected with the sender by a telegraphic or telephonic line, the occurrences were similar to those in the sender. The light, which varied in its intensity, was admitted through a small opening in the casing of a glass cylinder containing a sensitive photographic film, and which had axial and rotatory movements similar to and synchronous with the cylinder on the sender. This effected on the sensitive receiving film a reproduction of the picture on the photographically fixed film in the sender. The greater the intensity of the electric current received, the greater the light emitted by the electric incandescent lamp of the receiving apparatus, and *vice versa*. The most important operation here was the absolute synchronism of the two cylinders—that of the sender and that of the receiver.

Whereas with the earlier apparatus a picture 5.2 inches by 7.2 inches could be electrically transmitted and photographically reproduced in about 15 minutes, recent improvements have reduced the necessary time for transmission and reproduction to from 6 to 12 minutes only; and as far as shortening the time for transmission is concerned, there seems at present to be no limit.

The recent improvement is in the direction of doing away with, or of neutralizing, the undesirable property of selenium, that it is not only sensitive to varying intensities of light in its electric conductivity, but is also affected thereby in its resistance. The combating of this undesirable property is effected by a compensator, in the shape of a second selenium cell in the receiver, that has the same degree of sensibility to light and corresponding conductivity to electricity as that in the sender, and its mate in the receiver, but in the opposite direction, so that in its variations, no matter how long they may continue, it practically counteracts all error, and thereby obviates delay. In this manner, as well as by replacing the former needle galvanometer by one of the chord type, it is possible, first of all, to shorten the time required for transmission, and in the second place to obtain, furthermore, much clearer pictures in the receiver.

The times given as necessary for transmission are naturally only for overhead conductors. Such rapidity is not attainable with submarine cables, by reason of their greater capacity.

The professor exhibited two pictures, one of the German Kaiser and one of himself, that at a distance of a yard were hardly to be distinguished from ordinary photographs, and which, the professor stated, had been transmitted through a resistance corresponding to 1,800 kilometers, about 1,080 miles.

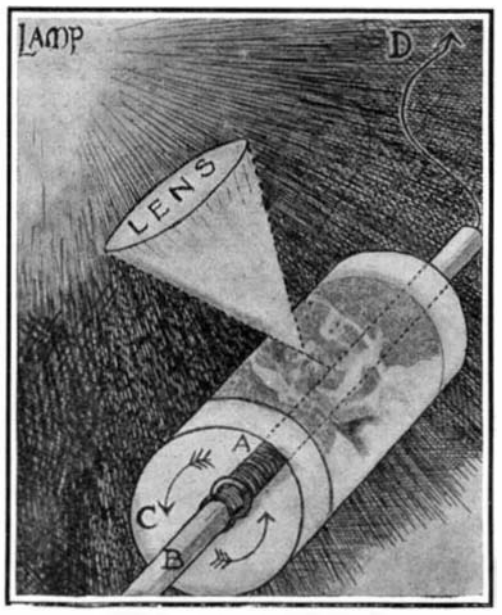
As regards the practical utilization of the invention, the professor stated that its application for purposes of crime detection would prove of the greatest value. The illustrated press has also naturally shown a great interest in the invention, and some of the European publishers have already made arrangements to use it. L'Illustration of Paris has purchased the sole rights for France up to July 1, 1909, after which these rights will revert to the inventor. That journal has the right to install sending apparatus in every country, and a receiver in Paris. The apparatus may be made by French manufacturers. For Germany the inventor has reserved all rights, and the apparatus will be made by a German firm. English journals show special interest in the matter, and both the Daily Mail and the Illustrated London News have taken steps toward the purchase of the English rights, but up to date the inventor has closed no contracts with them, in the expectation that an international company will shortly be formed.

When the German Kaiser was in München, Prof. Korn had made preparations to show him the apparatus and its workings; but the directors of the German Museum decided that the time would be too short, and the exhibition was not made. But the Kaiser manifested much interest therein, and ordered Prof. Slaby to give an explanation of the apparatus and its manner of working; this the latter did on November 27. In Paris, on the 3d of December, Poincaré read a paper on the subject of the selenium compensator and the new method.

In the spring there will be installed in Berlin and in some other important city, at a considerable distance therefrom, the apparatus for demonstrating on an actual working scale not merely the possibilities but the absolute practicability of the invention.

We illustrate herewith the really extraordinary results that Prof. Korn has obtained. As said before, the possibility of this remarkable electrical mechanical feat is due to a peculiar property of the metal selenium which can translate variations of light into concomitant variations of an electric current. Just as the diaphragm of a telephone causes the mechanical vibrations of sound to be reproduced in corresponding electric vibrations, so the action of variable light upon a plate of selenium, through which a current of electricity is passing, will cause that current to vary in exact accordance with the gradation of the light modified by a photographic film.

The apparatus will be best understood from the accompanying diagram. Like a telegraph or a telephone, there is at one end a transmitter, at the other end a receiver. In its simplest form the receiver consists of an outer metallic cylinder, and an inner cylinder of glass, on which is fixed the photographic film to be transmitted. The inner cylinder is made to revolve, and as it does so it passes an aperture in the metal cylinder, through which comes a focused beam from a Nernst lamp. This beam passes through the photographic film and thence to a prism, from which it is deflected to a plaque of selenium in the electric circuit. The variations of the revolving image are thus made to play upon the selenium, and are reproduced in the




**The Transmitter of 1903.**

A. Selenium cell; B, axis; C, glass cylinder carrying photo-film to be sent over the wire D.

electric wave passing through the selenium. The receiver consists primarily of a camera in which is another revolving cylinder carrying a sensitive film which is to receive the image. Through an aperture in the end of the camera comes another beam from a Nernst lamp which has previously been focused upon a Geissler tube. The tube (*G* in the diagram) is in the electric circuit, and the variations of the current are thus retranslated into variations of light, which, playing upon the sensitive film, set up the second image.

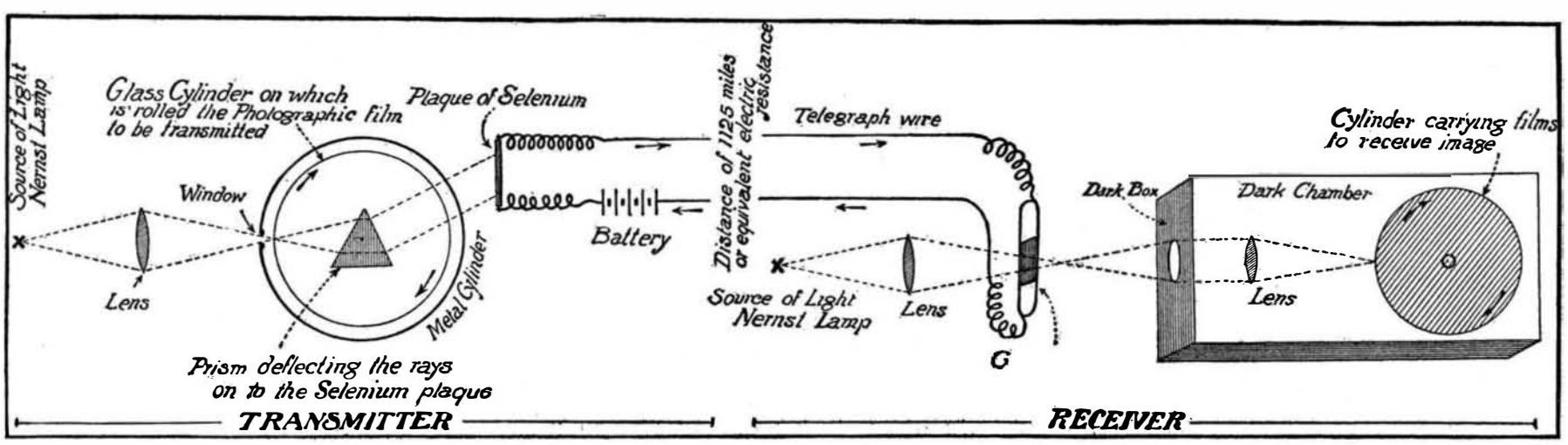



**Diagram Showing the Working of Prof. Korn's Latest Apparatus for Transmitting Photographic Images.**

A PHOTOGRAPHIC FAC-SIMILE TELEGRAPH.

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The period from 1840 to 1850 witnessed the establishment of commercial grape culture in the United States. A beginning was made in the manufacture of choice wine from American grapes on the Atlantic coast, the choicest Vinifera varieties were introduced on the Pacific coast, and wine made therefrom showed the pioneers of California that they could at no distant date enter into direct competition with Europe in the production of the choicest wines on the globe. It is to be regretted that so many of the fine wines produced have been sold under foreign labels of late years, there being but few of the better firms that have striven to make a reputation on their choicest wines, and the catering of the heaviest distributers to the cheaper trade has resulted in eliminating, to a very great extent, the growing of the better, less productive varieties of grapes; hence, a tendency toward producing quantity at the expense of quality. In 1850 the country produced 250,000 gallons of wine. In 1860 the product had reached over 1,500,000 gallons, and all the States and Territories, except four, were growing grapes. The census of 1860 showed California, New York, and Ohio as the three leading wine-producing States. From 1860 to 1875 rapid progress was made. In 1870 Missouri produced more than any other State except California. With this exception, California, New York, and Ohio have been in the lead. According to the last United States census (1900), twelve States reported having over 2,000,000 vines each in bearing.

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From L'Illustration.

**A Photograph of the German Crown Prince Electrically Transmitted to a Distance of Nearly 1,100 Miles. The Small Picture, from Which the Enlargement Was Made, is the Actual Result Obtained With the New Method.**

KORN'S PHOTOGRAPHIC FAC-SIMILE TELEGRAPHY.—[See page 148.]