

allax. The new star in Perseus, first seen at Greenwich on February 25, has been photographed every night since when weather permitted. The Astronomer Royal, by means of the expedition which went to Ovar, Portugal, to observe the total eclipse of the sun on May 28, 1900, has obtained five large-scale photographs of the corona; four pairs small-scale photographs showing the extension of the corona; and two photographs of the corona spectrum. The first contact could not be seen at Greenwich owing to the presence of clouds, but during the clear intervals eleven observations were made with the new altazimuth.

THE BERLINER TRANSMITTER PATENT HELD TO BE INVALID.

On Monday, June 24, 1901, Judge Brown, representing the United States Circuit Court for the District of Massachusetts, handed down the full text of the opinion of that court in the two so-called Berliner telephone patent cases.

These cases were practically decided in February last, and an additional mention of a rescript of the court's opinion was made in the columns of the SCIENTIFIC AMERICAN of March 9, 1901. The complete opinion of the court, however, was not made public at that time.

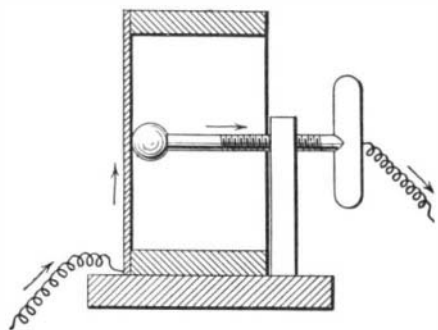
The two respective suits were brought by the American Bell Telephone Company in the form of bills in equity seeking to enjoin the National Telephone Manufacturing Company et al. and the Century Telephone Company et al. from infringing patent No. 463,569. As heretofore stated in these columns, the application for this patent was made by Emile Berliner on June 4, 1877, and was assigned to the Bell corporation the year following, but through the manipulations of the assignee's attorneys, the patent was not issued from the Patent Office until November 17, 1891. The logical effect of this delay was a tendency to prolong the monopoly of the Bell corporation, provided, of course, the patent was valid and could be given a broad interpretation in the courts.

In the suits in question the Bell corporation alleged the infringement of claims 1 and 2 of this patent, which are as follows:

"1. The method of producing in a circuit electrical undulations similar in form to sound-waves by causing the sound-waves to vary the pressure between electrodes in constant contact so as to strengthen and weaken the contact and thereby increase and diminish the resistance of the circuit, substantially as described.

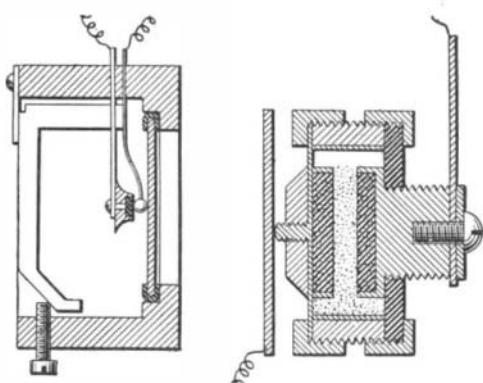
"2. An electric speaking-telephone transmitter operated by sound-waves and consisting of a plate sensitive to said sound-waves, electrodes in constant contact with each other and forming part of a circuit which includes a battery or other source of electric energy and adapted to increase and decrease the resistance of the electric circuit by the variation in pressure between them caused by the vibrational movement of said sensitive plate."

The structure shown in the patent and upon which these claims were based is represented in Fig. 1. The



current follows the path indicated by the arrows, passing from the metallic diaphragm to the metallic sphere in contact with the same. The screw serves to adjust the contact between the diaphragm and the sphere.

The transmitters used by the defendant corporations, and which were alleged by the complainant corporation



to infringe the structure above shown and defined in claims 1 and 2, are represented in Figs. 2 and 3. The structure shown in Fig. 2 is one form of the famil-

iar Blake transmitter. A little sphere of platinum is located between the diaphragm and a button of hard carbon, which is mounted upon a spring, and is adjustable toward and from the diaphragm.

In the transmitter shown in Fig. 3 a loose carbon powder lies between two solid carbon plates, one of which is actuated by the diaphragm, so that movements of the latter cause the loose carbon particles to be alternately pressed together and released. The carbon plates are encased and mounted upon a leaf-spring.

The defendant corporations contended among other things that the patent was void, and for the following reasons, to wit:

First, the patent as finally issued represented a different structure from that which Berliner described in the application as originally filed.

Second, that Edison and not Berliner was the inventor of the subject matter finally patented.

Third, that the structure which Berliner originally described in his application was old at the time the application was filed; and

Fourth, that a former patent issued to Berliner had disclosed his structure, and therefore the Patent Office had no power to issue another patent to him upon the same structure.

The merits of the case were argued at great length pro and con by distinguished counsel. The famous transmitter invented in Germany by Reis, several transmitters of Mr. Edison, and Bell's so-called liquid transmitter were brought into discussion, the question being whether these devices anticipated Berliner's structure and patent. Much expert testimony was taken.

One important question presented by the suits was whether a metallic sphere adjustable against the vibratory diaphragm and claimed broadly could anticipate the well-known carbon transmitter. The peculiar properties of carbon for this purpose were apparently unknown to Berliner or anybody else at the time the application was originally filed. In other words, it was a question whether a metallic contact in a transmitter, broadly claimed, could anticipate a carbon contact of variable resistance, the variable-resistance property of the carbon being unknown at the time of the application.

Referring to the anticipatory effect of Bell's liquid transmitter, the patent for which had formerly belonged to the complainant corporation but had expired, so that the public had a right to use the invention, the court significantly remarked:

"The attempt to dispose of that apparatus by characterizing it as a mere laboratory experiment, after it was presented to the Supreme Court as a speaking telephone (126 U. S., 247 to 322) is not successful. This instrument is quite as important after the expiration of Bell's patent as it was before."

Upon the subject of the difference in scope between the patent in suit and the original application therefor as filed in the Patent Office by Berliner, the court said:

"I am of the opinion that the language of these claims is clear and that no resort to the specifications is necessary to explain its meaning. They are not claims made in the infancy of an art by an unskilled inventor. They were put in the present form more than two years after Edison's carbon telephone had been placed on the market."

Discussing the changes alleged to have been made in the structure and action of the apparatus after the original application had been filed and before the patent was issued, the court observed:

"The patent calls for constant contact of electrodes and an unbroken current; the application, for an interrupted contact and a broken current. The Supreme Court has decided that these methods are radically distinct. (126 U. S., 544 to 545)."

The learned judge summed up the opinion of the court in the following language:

"I am, therefore, of the opinion that even if the complainant were able to prove that Berliner had in fact made an invention; that his application upon its face disclosed this invention; that he was lawfully entitled to make the amendments; and that his previous patent of 1880 did not exhaust the power of the Commissioner to grant the patent in suit, and that he was not anticipated by Edison; that, even after all this, well-established rules of law would require us to hold that claim 1 of this patent is void, and that claim 2 is either void or so limited that it does not include the defendants' transmitters.

"It has been impossible, in this opinion, to consider all the points of the very able arguments that have been presented, or all the important contentions that have arisen. The brief of the defendants has met the case of the complainant thoroughly and completely, and with very exceptional ability and commendable fairness has demonstrated, in my opinion, that the complainant's case rests upon a patent that should not have been granted, and which is void for error apparent upon the face of the records of the Patent Office; that as a matter of fact Berliner on June 4, 1877, the date of his application, had not made the discovery that speech could be transmitted with the apparatus of the patent in suit, and was at that time, and long after, like other unsuccessful experimenters, attempting to use a broken current. In addition to the fundamental defects in the complainant's title to the patent, it appears that the best argument that skilled experts and learned and ingenious counsel can base upon this patent is logically untenable and legally unsound.

"The bills will be dismissed."

PARIS-BERLIN AUTOMOBILE RACE.

Racing automobiles were never put to a more severe test than in the Paris-Berlin race. The machines started on June 28 from Champigny, a suburb of Paris, and finished their trip June 29, at Berlin. M. Fournier, with a Mors carriage, covered the 750 miles in record time. A crowd of 2,000 persons witnessed the start. One firm of automobile builders had a staff of seventy-seven mechanics on the ground to inspect their machines before leaving. The route was by Aix-la-Chapelle and Hanover. M. Fournier was the first to arrive at the former place. He stated that the crowds which lined the road during the last 40 miles were so great that he constantly feared there would be a fatal accident. M. Fournier's actual racing time for the 282½ miles was 6 hours and 58 minutes, road-rules compelling him to slow down in many towns and villages. The next day's trip was from Aix-la-Chapelle to Hanover, a distance of 275 miles. M. Fournier was again the first to arrive at the end of the second stage of the race. His time was 9 hours 7 minutes and 39 seconds. Many of the drivers of the automobiles were so exhausted and nerve-shaken at the end of their second day's trip that they could hardly speak. The bad condition of the roads and the hot sun which affected the tires, prevented any very phenomenal speed. There were a number of accidents on both days' runs. The third stage from Hanover to Berlin, 297 miles, was made in 11 hours, 46 minutes and 10 seconds. M. Giradot, on a Panhard machine, finished second in 12 hours, 15 minutes and 40 seconds; M. Brasier was third. The reception of the riders by the Germans at Berlin was an ovation.

SCIENCE NOTES.

Dr. Vaughan Cornish, F. G. S., gave an interesting lecture at the London Geographical Society concerning waves, illustrated with photographs which he had secured during his investigations. Regarding ocean waves and the enormous heights they are generally supposed to attain, Dr. Cornish stated that the average height of waves in mid-ocean was 18 feet, though waves 30 feet in height were by no means uncommon. During a recent storm in the North Atlantic, however, the lecturer had measured some of the waves and found that they attained the extraordinary height of 40 feet.

Sir Norman Lockyer, the eminent English astronomer, resigns his position as Professor of Astronomical Physics at the Royal College of Science, South Kensington, London, at the end of the present year. He has been connected with the Department of Science and Art for twenty-six years. Between the years 1870 and 1900 he was the chief of seven eclipse expeditions, and his volume "Recent and Coming Eclipses," based upon his investigations during those thirty years, is a valuable addition to scientific literature. Sir Norman Lockyer, however, proposes to retain his position as Director of Solar Physics at the South Kensington Observatory.

The farmers in South Lincolnshire (England) have been suffering from a plague of insects called the mustard bug, which devours the white mustard crops. Several farmers have had acres of valuable crops destroyed by this pest, and have been unable to discover an efficacious remedy. They have now resolved upon a curious expedient. Flocks of chickens are turned into the white mustard fields, and since the bug is somewhat of a delicacy to the fowl, it is anticipated that the pest will be overcome and that the crops so far untouched will be saved.

The first sealed thermometer was made some time prior to 1654 by Ferdinand II., Grand Duke of Tuscany; he filled the bulb and part of the tube with alcohol, and then sealed the tube by melting the glass tip, says The Engineer. There appears to be considerable doubt as to who first employed mercury as the thermometric liquid; the Academia del Cimento used such an instrument in 1657, and they were known in Paris in 1659. Fahrenheit, however, appears to have been the first to construct, in 1714, mercury thermometers having trustworthy scales. The use of the boiling point of water as the upper fixed point was suggested by Carlo Renaldini in 1694.

DEATH OF PROF. JOHN FISKE.

Professor John Fiske, of Cambridge, the historian and philosopher, died from the effects of the heat on July 4th. He was born in Hartford, Conn., March 30, 1842. As a boy he was extremely precocious; he began the study of Latin when only six years old, and at seven he was reading Cæsar. In 1860 he entered the Sophomore class of Harvard and finally became a lawyer. He did not practise law to any extent, but commenced to write for magazines and reviews. In the scientific world he was regarded as a specially able expounder of the philosophy of Herbert Spencer and the theory of evolution. His scientific writings were considerable.