

names of any of the thousand and one guns that are non-automatic. This led the editor of the paper in question to write a series of bitter articles tending to show that Blakeley, Vavasour, Moncrieff and others had made automatic guns before Mr. Maxim took out his patent.

Mr. Maxim, in a very characteristic and effective reply, points out that the merit of his invention is proved by the fact that it very soon took the place of all other machine guns, driving them out of the field. It was so superior to the hand-operated guns that it was adopted by nations which, up to that time, had not admitted a machine gun into the service. "If the automatic system was so well known," Mr. Maxim pertinently asks, "why was it not taken up before? . . . Why did all Europe wait for a 'Yankee' to come to Europe and make an automatic gun for them?" An investigation of the patents quoted by the Admiralty and Horse Guards Gazette showed that the greater part of them did not relate to anything that could be twisted into meaning an automatic gun.

Mr. Maxim draws a parallel between this attempt to discredit him as an inventor and the attack on Mr. Bessemer in connection with the Kelly patents for making steel, and we think his contention is a sound one. We deprecated the course taken by Mr. Weeks in the Bessemer-Kelly matter as not being justified by the facts and as causing unnecessary annoyance to a distinguished inventor and great benefactor of the race. So, too, in the present controversy we think the editor of the paper in question has entirely failed to make good his point, and has sought in vain to cast a shadow upon the title of Mr. Maxim to be the originator of the type of gun which bears his name.

THE BERLINER TELEPHONE TRANSMITTER PATENT SUSTAINED.

The decision of the United States Supreme Court on May 10, 1897, sustaining the decision of the United States Court of Appeals, rendered May 18, 1895, and which, in turn, was a reversal of a decision given in favor of annulling the Berliner (November 17, 1891) microphone patent by Judge Carpenter, of the United States Circuit Court in the District of Massachusetts, on December 18, 1894, will, without doubt, interest all users and manufacturers of telephones, and in some degree confirm the popular belief that the issue of the patent was purposely delayed to aid the extension of the monopoly in the telephone business so long enjoyed by the American Bell Telephone Company.

The record of the several decisions regarding this patent will be found in previous issues of the SCIENTIFIC AMERICAN as far back as 1893, when the suit to annul the patent was begun by United States Attorney General Harmon. The facts in the history of the case are that the application for the patent entitled a "Combined Telegraph and Telephone" was filed on June 4, 1877. The claims are said to be generic, covering the microphone and the art of microphony. Three years later, in September, 1880, Berliner filed a second application for a patent on apparently the same invention, under the title of an "Electric Telephone," which was claimed to be a division of the first or original application. Two months later this patent was issued, November 2, 1880. Subsequently the board of examiners-in-chief decided that the 1880 patent was for an invention distinct from the patent of 1891, and also that the additional new matter put into the first application was allowable. The claims of the 1880 patent describe an apparatus for reproducing sound by means of a varying electric current passing between two electrodes in contact. The patent expires November 2, 1897.

Some time prior to 1880 Berliner assigned his rights in both applications to the American Bell Telephone Company, and later, discovering the advantage of the carbon transmitter, amended the 1877 application by erasing the entire specification and drawings and substituting another drawing and specification, with new claims more in accordance with the state of the art as it was then understood. The drawing resembled identically that in the patent of November 2, 1880.

In 1882 Berliner claimed that a patent was to be allowed on the amended application, but, in consequence of a rejection, somewhat unexpectedly, of all the claims and subsequent appeals, a further delay was incurred.

Then, again, subsequent interference proceedings ensued, appearing perfectly proper and legitimate on their face, but in reality were fathered on both sides by the telephone company, enabling the latter by the usual methods of agreement or understanding between opposing counsel to delay a final decision until such time as they desired it to be made. This was in November, 1891, just after the United States Supreme Court decided adversely the claims of Drawbaugh.

It is interesting to note that the claims allowed in the 1891 patent described an electric telephone transmitter in which the sound waves vary the pressure between electrodes in constant contact, and thereby vary the resistance in a constant electric circuit, to accord with vibrations of a diaphragm plate.

The operation is so similar to that of the 1880 patent that there would seem to be good ground for contest in

the future, on the assumption that one applicant cannot hold two patents for the same invention.

The grounds upon which the government asked to have the 1891 patent set aside were that the delay of fourteen years in the granting of the patent was fraudulent and due to corruption of the Patent Office officials by the owners of the application (the telephone company) or to collusion; and, second, that the patent of 1880 covered the same ground as the later patent of 1891.

Justices Gray and Brown took no part in the decision. Justice Harlan dissented, without giving an opinion. Justice Brewer delivered the opinion of the court, which was in part substantially as follows:

"Mr. Bell had invented the telephone, and, as that patent had expired, all the monopoly which attaches to it alone has ceased and the right to use it has become public property. But his apparatus was insufficient for public uses. Berliner's patent supplied the deficiency of existing patents, as he invented something by which, taken in connection with Edison's and Blake's inventions, Bell's undulating current could be made practically available for carrying on conversations at long distances. In other words, the telephone used to-day is not only that of Bell, but of Edison, Blake, and Berliner as well. Therefore, the right to use the Bell patent alone would be a barren one, extending the telephone patent to life of the Berliner patent.

"An application for patent cannot be considered and determined on the instant. Hence there could be no complaint on the mere fact of delay, though there might be of its excessiveness. But, it mattered not whether the delay be reasonable or unreasonable, if the applicant is not responsible for it. If the fault was that of the Patent Office, the applicant is not held blameworthy, and his legal rights are not affected. He cannot be punished on account of the delay or negligence of the tribunal before which he is presenting his suit.

"If there should be a new invention upon the expiration of the Berliner patent, the rights of its author could not be abridged to relieve the public. The inventor of the latest addition is entitled to full protection, and if the telephone company buys that invention, it is entitled to all the rights which the inventor had. The court dissents entirely from the views urged by counsel that the applicant for a patent is a quasi trustee for the public, but holds that an invention is the absolute property of its inventor. The government, in order to make its case, must establish affirmatively that the delay in the Patent Office was caused by the conduct of the applicant. It cannot rest on mere inferences, but must prove the wrong in such a manner as to satisfy the judgment before it can destroy that which its own agents have created. This requirement the government had failed to meet.

"There was no testimony as to any corruption of the officers of the department by the defendants, or any attempt at such corruption. So far, indeed, as was shown, there never was an intimation made to a single official that he could profit by a moment's delay. All thought of wrong, therefore, may be put aside."

Of the contention that a patent issued November 2, 1880, upon a division of the original application, covers the same invention as that covered by the patent in suit, and exhausted the power of the Commissioner as to that invention, he said "the patent of 1880 was for a receiver, while that of 1891 was for a transmitter. It was claimed that the two inventions were one, but the decision of the Patent Office was against this contention, and this judgment could not be reviewed in the present suit."

"Congress had established the Patent Office, and had thereby created a tribunal to pass upon all questions of novelty and utility, and had given to that office exclusive jurisdiction in the first instance, with specifications of circumstances under which they might be reviewed.

"It would seem that the government should be as firmly bound by the decision of its own tribunal as individuals. There might, he concluded, have been an error on the part of the officials as to the existence of power or a mistake in the instrument itself, sufficient to justify a decree canceling the patent. Also, the deviation of the proceedings between the application and the patent may be such as to justify the interposition of the court of equity; but it was not intended that the courts of the United States, sitting as courts of equity, could entertain jurisdiction of a suit by the United States to set aside a patent for an invention, on the ground of error of judgment on the part of the patent officials. Hence this question was not now open for consideration."

The conclusions of Justice Brewer were as follows:

"We hold in respect to a suit to set aside a patent for an invention that, as in cases brought to set aside patent for land, the government must establish the grounds of relief by testimony which is clear, convincing and satisfactory, and not upon a mere preponderance of testimony.

"We also hold that there is no evidence in the record—not the slightest—that there was any corruption or

undue influence exercised by the officials of the telephone company to secure any delay in the Patent Office; that there is no evidence which justifies an inference that the delay was either at the instance or with the procurement or at the solicitation of the telephone company or its officials, and that whatever delay there was, was caused by the action of the officials of the Patent Office, for which the telephone company is not responsible.

"We hold, therefore, that there is an absolute failure to show any wrong on the part of the telephone company in this delay in the Patent Office; and as to the other grounds of attack, they are matters which, under the statute law, are open to every individual to set up in a suit brought against him by the holders of the patent, and that so far as these particular matters are concerned, they are not such as to justify the interference of a court of equity to set aside the patent.

"The decree of the court below is affirmed." This is said to be the first case of an application by the government to annul a patent for an invention on the ground of fraud. The decision of the court in defining the difference between a patent of land and a patent on an invention is commendable, especially when it dissents from the view taken by the counsel for the government that an applicant for a patent is a quasi trustee for the public.

The court holds, on the contrary, that an invention is the absolute property of the inventor, emphasizing the intent of the patent law that a mental conception resulting in a perfected invention belongs strictly to the inventor. But as a compensation for its disclosure a patent is granted, wholly negative in character, since it gives the inventor nothing he did not have, but acts merely as a bar to the unauthorized use of his property by others.

The court left undetermined the question of the validity of the patent of 1891 as related to the prior patent of 1880 for apparently the same invention. Until this question has been adjudicated, the validity of the later, 1891, patent may be doubted. In the meantime, however, until such a contest is brought about, it may be supposed that the telephone company considers it has a monopoly of telephone transmitters until 1908, about thirty years after the date the original application was filed.

AN ADVANCE IN THE ELECTRICAL EQUIPMENT OF STEAM RAILROADS.

For several months past the directors of the New York, New Haven and Hartford Railroad have caused preparations to be made for the converting of an old steam railroad (a section of the New England Railroad) paralleling their tracks between the cities of New Britain and Hartford, Conn., a distance of some thirteen miles, into an electrically equipped road, with a view of testing practically the possibilities of electricity as a motive power in actual railroading.

At Berlin, Conn., located near one end of the road, has been built a mammoth power station, and on the roadbed, between the rails, a third iron rail, elevated about six or eight inches above the level of the roadbed, has been laid, supported on creosoted wood posts, the rail having the shape of an inverted V. Such construction does not interfere with the use of the road by the usual steam locomotives.

A preliminary official trial, in the presence of the president, Charles P. Clark, and directors of both roads, was made on May 10, Col. H. H. Heft, chief of the electric power department, having charge of the controlling switch, and the first trip was made from Berlin to New Britain, a distance of two and one-half miles, in six minutes, and then on to Hartford, the whole trip taking but eighteen minutes. The position of the car was readily maintained at an even headway between two trains drawn by locomotives, proving that it is possible to utilize both kinds of motive power on one track at the same time. The motorcar, of the open excursion type, weighed 32 tons and carried 70 persons, and was propelled by an electric motor of 125 horse power. The current was produced at the dynamo at a pressure of 660 volts. Six 110 volt incandescent lamps in series at the further end of the line, thirteen miles distant, burned brightly, showing that the electrical pressure was more than sufficient to move the train, and also how easily the current is carried that distance without supplementary feeder wires and with no appreciable loss by leakage.

The current is conveyed to the car motor from the third rail by a sliding iron shoe, and returns by way of the rails.

It is estimated the cost of equipping a road on this plan is about one-fifth that of a trolley line.

All stations have been fenced in and danger notices put up along the tracks to warn pedestrians and workmen. It is expected some time this month the trains will run regularly every twenty minutes between the two cities.

THE ETNA RAILWAY in Sicily, which will be completed in a few months, begins at Ripasto and terminates at Catania, is 72½ miles long, and nearly the whole distance is already opened.