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purposes unless it would talk, without holding it to the ear, and convey the sound as far as ordinary speech. He wanted it to talk out as a man talks."

This testimony by Free is referred to in this connection: "He told me that he wanted to accomplish, and could do it, to make a machine that you could stay in one corner of the room, and putting the machine in the other corner, and hear as distinctly as putting it to the ear" — and that Drawbaugh told him that he had not done it yet, but "I am working at it and I am going to get it accomplished."

Now, in 1876, at the time of the Centennial, when it is claimed that Mr. Alexander Graham Bell laid the superstructure of his great reputation — at that time, this man supposed that a telephone had no commercial value unless it talked out loud. At that very time that he has detailed he was doing this, the *New York Tribune* thought that the only use of the telephone would be for "diplomats and lovers"; and the *Scientific American* summed up the public opinion of it as "a beautiful scientific toy"; and Gardner G. Hubbard, the partner and father-in-law of Mr. Bell — a telegraph manager and Mr. Bell's financial backer, "did not then believe the transmission of speech could be made commercially valuable." At the time that they had that estimation of it, Drawbaugh's idea of it was that it was of no value unless it talked out loud. And that was the solution of that branch of this question, which in my judgment these gentlemen have very quietly, carefully and scientifically avoided.

We rely, for the Overland Telegraph Company, upon all the defences that appear upon this record. We appreciate most heartily and thoroughly the presentation of what is called the Reis defence by my brethren Mr. Lowrey and Mr. Peckham; but we think the Drawbaugh defence is a very serious one here; and so far as the Overland Company is concerned, we rely upon the whole record.

*Mr. Hill* for the People's Company, and The Overland Company, in reply:

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Before I enter upon the argument of the disputed propositions in this case, I beg leave to say a word or two in explanation of a matter which I have feared, perhaps unnecessarily feared, might not be thoroughly understood by the court; and that is as to what is really shown of the history of the case by a glance at a patent that is issued upon any day; as, for example, the patent to Alexander Graham Bell issued on March 7th, 1876. Several questions have been asked by the court with reference to that; and I fear that matter may not be perfectly clear.

When an application is filed in the Patent Office, the practice is to allow that application to be amended, formally or informally, sometimes in pencil marks, marked by the applicant, or by his attorney, upon the specification remaining in the Patent Office. When that is received, the examiner places it on file, goes to the specification, and marks around the passage that is amended red lines, striking it out and noting on it that the amendment marked A, B or C, or whatever it is, is substituted for that passage, and giving the date also. But when the patent finally issues, that document, with its amendments, is sent to the government printer, and the government printer prints it as finally corrected. The print that he makes is a clean, clear copy of the thing as finally amended; and that printed patent which comes from the government printing office does not show that any change whatever has been made in the document. The original is sent from the government printing office back to the Patent Office, and remains on file there, and is a part of what is called the "File wrapper and contents."

THE CHIEF JUSTICE: In that connection I want to ask a question. A paper was laid on my table this morning, called "Certified Copy of Exhibit," which appears to be a certified copy of a patent.

*Mr. Storrow:* Your Honor has had that paper for ten days.

THE CHIEF JUSTICE: That paper, as I understand it, is a certified copy of the file wrapper in Bell's case, showing the corrections.

*Mr. Storrow:* No, sir; that is the certified copy brought

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by Mr. Stetson, the clerk, from Boston, of exhibits which he produced. It shows the blue lines and pencil marks. I have already told that story.

*Mr. Hill* : When any party applies to the Commissioner of Patents, and asks for a certified copy of that file wrapper and contents, he gets a certified copy, among other things, of the document which was originally filed, with all the marks which were on it, whatever they may be, and however they may have been placed upon it. The rule in the office of the Commissioner is to very carefully place those marks on that certified copy exactly as they are on the original. Hence, in this case you can gather nothing from the patent—from the printed patent of March 7th, 1876—as to the prior history of the application in the Patent Office. You will read in that patent only the final result of the whole. But, if you take the certified copy of April 10th, 1879, as printed in the Dowd record—which is a true copy, or is assumed to be, of the record as it then appeared, then if you look at that copy, that being a certified copy, you get not only the original document which was filed in the Patent Office, but you find noted on that copy the various changes which were made in it while it was there and before the patent issued.

The pencil memoranda and obliterations of words—the memoranda appearing in the 1879 copy, showing that words were originally in the document, as far as we can gather from the 1879 printed copy in the Dowd case—that words were originally in the document, which do not appear in the patent, show the state of the record, and show how those words appear on the document; but they do not appear there now. The patent, as it issued March 7th, 1876, does not show that; because the patent shows only the final form, the corrected form; it does not show how the corrections were made.

THE CHIEF JUSTICE : I understand you to say that the pencil memoranda upon the Boston paper are the corrections as finally made, and that, therefore, they should have made part of the specifications as put in the patent.

*Mr. Hill* : When I get along a little further in my argument I shall endeavor to show you that the paper brought

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here from Boston is a paper which has been doctored to explain this thing.

[*Mr. Hill* then reviewed the answers that had been made to his argument upon the paper known as the George Brown specification, contending that the facts which he regarded as very damaging had not been explained ; and that it was impossible that Mr. Brown, a capitalist proceeding to Europe to invest his money in the invention, entering into a contract with Mr. Bell to give him so many dollars per month to further develop his invention, taking a half interest in the invention abroad, should be willing to go to Europe to patent the invention there, knowing, as he must have known when he left New York, that there was another current which would do the work equally well, if Mr. Storrow's theory was correct, and if that other current was in the American specification. He maintained that Brown desired to use the invention to prevent the lagging of cable signals ; that the magneto currents caused by the induction of an armature, which were the only currents Bell had in his mind, were so light and feeble that it was impossible to use them for that purpose ; that so far as Bell in May, 1875, had an idea of varying the resistance, it was limited to one form of apparatus — to vibrate a stretched rod or wire, varying the current, and that this was a failure and was abandoned ; and that there was no explanation of the fact that Bell]

“Went home from his visit to Washington on February 25 or 26 to March 3, 1876, and immediately proceeded to construct a liquid transmitter like Gray's, got speech through it on March 10 and then kept still about it and concealed the fact — no explanation that the next step that he took was to construct two magneto devices just like Gray's receiver on or about the 1st of April, and then got speech through them ; and that in his London lecture a year afterwards he tried to connect the experiment of 1875 directly with those two experiments of April, 1876, without giving the dates, but jumping over and keeping still about the intervening solution of the question of the transmission of speech on March 10.”

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Mr. Dickerson says that Bell's and Gray's instruments operate on exactly opposite principles. He says that Gray had the idea of varying the resistance of the liquid by varying the amount of liquid between the poles by bringing the poles nearer together. But he says that it was not Bell's idea to vary the resistance of the liquid. Let me read what Mr. Dickerson says. I find it in my copy of the arguments, on page 1114 :

"Now you see the points of these two things. They are both supposed to be, they both are properly called, liquid transmitters. They work on directly opposite principles. One works upon the principle of approximating the two opposite poles and having a film of liquid between them, whose thickness is varied by the vibration; and the other operates upon the principle of dipping one of those poles in the water and thereby delivering more electricity or less." Dipping it in water, or in the liquid, thereby delivering more or less electricity.

Now what does the patent say? I appeal from Mr. Dickerson, Mr. Bell's counsel, arguing the case here and presenting a plausible theory to lead the court to his view of the case, to Mr. Bell, and I appeal to his decision of this question in the patent itself. Mr. Bell says: "The reciprocal vibration of the elements of a battery, therefore, occasions an undulatory action in the voltaic current. The external resistance may also be varied. For instance, let mercury or some other liquid form part of a voltaic circuit, then the more deeply the conducting wire is immersed in the mercury or other liquid, the less resistance does the liquid offer to the passage of the current." That is what Mr. Bell says, and he says: "Hence the vibration of the conducting wire" produces this effect. This description of Mr. Bell is exactly the description of Gray's caveat transmitter.

Then I come to another subject. There is another important matter which my friends have attempted to explain. I refer to the attempted explanation of how that certified copy of April 10, 1879, came to be printed and appear in the record as it does appear. Before I enter upon this explanation I wish to

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say that when my associate, Mr. Dixon, in his very careful, thorough, and able investigation of the facts in this case had developed the fact that there was an apparent and evident fraud indicated by the documents on file in the suit, we had no other evidence except those arguments to refer to, and they seemed to be absolutely conclusive of the whole subject as to the fraud, what it was, when it was perpetrated, and how it was perpetrated; absolutely conclusive of the fact that since the 10th of April, 1879, the Patent Office paper had been abstracted and another document filed in the file wrapper of the Bell application, appearing there now as the specification that was filed by Bell. It was immediately apparent that if that fraud had been committed in the Patent Office there was an absolute necessity imposed upon the party who committed it to commit the same fraud in the Circuit Court in Boston, because there was a certified copy of that document as it existed on April 10, 1879, known to be filed in that court in Boston. If they abstracted one of those copies and substituted a false copy in its place, it would be necessary to do the same thing with the other, or the other would give away the whole proceeding. It was liable at any time to expose the whole thing. Then came the question, But how could they do it? How could they make that alteration or that change in the record in Boston? Of course, it was easy enough to do it as a physical matter. The case was an old case that had been settled and disposed of. The obliging clerk would allow anybody who came in there and wanted to look at those papers to take the file "wrapper, sit down at the table, open them and examine them, as is always allowed in those matters. He would not be particularly careful about it because it was an old case, an old file, years old, everything past and done.

[*Mr. Hill* then argued at length that these interlineations had been fraudulently made, and continued:]

Now, may it please your Honors, with but a very short time to spare, I must review a few points in connection with the Drawbaugh defence. My learned brothers have argued on the other side that in law oral evidence has never been allowed to overthrow a patent. It is hardly necessary for me to treat

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that question. If it were I would refer to *Gayler v. Wilder*, 10 How. 477, and *Coffin v. Ogden*, 18 Wall. 120.

It is said that the instrument marked I in the Drawbaugh exhibits had no magnet on it when found; that is true, that when the original model was put in evidence the magnet was not with it; but after it had been produced before the examiner, and put in evidence, Mr. Drawbaugh found among his various magnets at the shop a magnet which he recognized as the original used in that. He brought that magnet over and placed it on the instrument and it fitted its place exactly, both in its height, in the size of the poles which fitted the holes made for it, and in every respect it showed for itself at once that it was the magnet originally in the instrument.

It is said that the tumbler F could not be adjusted unless the bottom was out of it originally. They point to the fact that the bottom of the old tumbler is broken off, and that we have attempted to say it was closed up; and they state to the court that that is nonsense, because the instrument could not be adjusted in that case; and yet, your Honors, that is the exact fact, that the tumbler instrument F can be adjusted. The bottom was in there; they are adjusted by the screw rod at the top and not from the bottom. I mention that matter to show you what trifling things are brought before the court as evidence of importance, when they really have no importance at all, and they are answered by the condition of the instruments right in your presence.

It is said that a string telephone existed in Drawbaugh's shop in those early days: but there is not a word of evidence of the kind.

In regard to the tests made in New York and Philadelphia I want to be more particular in calling the attention of the court to the extraordinary misrepresentations that have been made regarding those tests. The history of the New York and Philadelphia tests is substantially this: When these Drawbaugh instruments were first put in evidence, the originals (the early ones) were dilapidated,—in some cases one or two of the parts gone,—and I directed Mr. Drawbaugh to make a set of instruments that would show exactly what the

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parts were, how they were related to the other, the other parts, if they were all there, and put them in as reproductions. The original instruments were offered in evidence just as they stood, and then I directed him to make reproductions to show the parts that were gone. For instance, in the tin can instrument the tin can remained there. The electro-magnet remained there, but the original diaphragm had been a membrane. The mice had eaten it off or something, and it had gone. I directed him to make another instrument, having the tin can and the electro-magnet just the same, and to put a diaphragm on it, and if there was anything on the diaphragm that would show, whatever it was. So he made one, which appears as the reproduced instrument. In the same way the tumbler instrument was reproduced and put in evidence; not for the purpose of testing; we never had any idea of testing those instruments, but merely to show the court what the relations of those parts were, so far as any of them were absent, what they were in the original machines. About the time Mr. Drawbaugh was testifying, the latter part of the taking of the testimony in the case, Mr. Benjamin, the expert, had the curiosity to try some of those instruments and see if they would operate: and he tested them and found that they would operate more or less as talking telephones — those instruments that are put in in that way merely show what the relations of the parts were. A test of those instruments was called for by my friends on the other side, and we made the test in New York at the end of Mr. Benjamin's testimony, or near the end of it. We had no time to make other instruments, to make other reproductions; in order to have the parts new and properly arranged and constructed, in operative condition, we had to take the old instruments that we had, the only set we had, the old reproduced instruments which had been in evidence for two or three years; which had been to Harrisburg, to Baltimore, to Philadelphia, to New York, to Washington, back and forth dozens of times; which had been taken apart and examined by counsel and by experts and by draftsmen, and had got in a very dilapidated condition; that is, the parts had got loose and out of position, many of them.

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In the instrument A, if your Honors remember it — a little flat box with a hole near the centre — that instrument had been so badly handled and abused that the diaphragm inside of it had become broken in two, showing to what roughness of handling those instruments had been subjected. We had to take those instruments and adjust them the best we could and make the tests in New York, in order to accommodate these gentlemen, as we had no time to prepare new instruments; and they would have objected to them probably if we had, as not being in evidence. The tests were made in New York, and all the original instruments of Drawbaugh, the instrument H, the instrument A, the two instruments B and D, and the magneto instrument J, that handsome black walnut instrument about so square [indicating] — all those instruments operated perfectly well. They were the original instruments of Drawbaugh. The only instruments that did not operate perfectly satisfactorily were the reproduced instruments that we had made, not for testing, but simply to exhibit the arrangement of the parts. They did not operate perfectly satisfactorily; but they did operate as speaking telephones, and did transmit sentences, and were by no means conceded or claimed as failures, even those that were most dilapidated.

THE CHIEF JUSTICE : That was the tumbler ?

*Mr. Hill* : Yes, your Honor; the tumbler operated. I will show you the testimony in a moment, Defendants' Vol. 2, Mr. Benjamin's testimony on pages 1278 and 1279. We will settle that matter at once. Mr. Benjamin testifies:

“Here are some sentences, which I read from the notes, which I heard distinctly through F and A.”

F is the tumbler; A is the round box.

THE CHIEF JUSTICE : Is that the New York test ?

*Mr. Hill* : That is the New York test. Mr. Benjamin testifying about the New York test and about the tumbler instruments which were used there, he says :

“Here are some sentences, which I read from the notes which I heard distinctly through F and A, and caused to be repeated back through the ‘tell-tale’ line to the room from which they were transmitted, and where the notes were taken by Mr. Marx.”

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The first sentence was: "What shall I do now? Shall I read to you something?" That was transmitted through the tumbler instrument at the New York test. Another: "I will read again." That was perfectly transmitted. Another: "Now, listen, while I talk. Do you hear that?" That was transmitted through the tumbler instrument at New York. Another: "How plainly can you hear me?" That was correctly transmitted. Again: "Is now almost at its height." That was transmitted perfectly well. Again: "For his action in the Lamson case." Those words were transmitted perfectly. Then he says:

"I have taken these sentences at random from the notes made in the back room, and I introduced them here merely to show the extent of the sentences that I clearly heard through F and A."

Then here is another. He put a Tisdel receiver on in place of A. He says:

"When F was used as a transmitter with a Tisdel magneto instrument as a receiver, sentences and words were received a little, though not much better. Here are some of the sentences heard and repeated by me, and taken down by the stenographer in the front room."

Here is one of them now, with the tumbler instrument, in New York:

"Have you heard of Judge Wallace's appointment? How do you like it?"

Again, "Shall I read an article to you now?"

Again, "How far can you understand what I say?"

Then Mr. Benjamin says:

"I was, and am still, of the opinion that the Tisdel hand instrument used was somewhat out of adjustment, owing to rough handling."

Then he says:

"I took the Tisdel instrument off the line, after using it for quite a short time with F as a transmitter, and substituted a Bell instrument, through which I received in the front room the following sentences, spoken into F in the back room."

The instrument F is the tumbler. He says:

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"The following are some of the sentences heard :  
'Dan Drawbaugh is standing by my side.'  
'Do you like a Bell receiver better than a Tisdel ?'  
'Do you get it better now than before ?'  
'Do you think you can hear reading ?'  
'I will read something from the paper.'"

Now another long sentence.

"I said : 'Repeat what you read so that I can see whether you get it right or not.'"

That was sent through the F instrument. Then another sentence of a more emphatic nature, with reference to his not hearing correctly printed matter.

MR. JUSTICE FIELD: Those are the experiments at New York ?

*Mr. Hill:* Those are the experiments at New York. Those are the performances of that F instrument at New York, where my brothers have told you in their argument that the thing was an utter total failure and that nothing could be done at all. Those are the representations that have been made to you about those tests ; and yet that very instrument was doing those things there. It was not doing as well as it ought to have done ; it was difficult to keep the adjustment. Mr. Benjamin says it was a perpetual struggle for adjustment. So that when the Overland case came we made further tests. We have been criticised for not making further tests in the New York case. Why, we made the tests at the very last end of our testimony. Our testimony was all in, Mr. Benjamin was the last witness we had. Then the other side put in their rebuttal and we could answer that but we had no right to any further evidence in the main case. In the Overland case, however, where the evidence was not completed, we subsequently made other tests. We had there made for the purpose of those tests correct copies of the instruments used in New York. We employed Professor Barker.

THE CHIEF JUSTICE: I want to ask you in that connection — I don't know whether I understood you — do I understand that these words which you say were transmitted and heard by Mr. Benjamin were sent through a tumbler instrument or were they sent through another instrument ?

## Opinion of the Court.

*Mr. Hill*: Sent through a tumbler instrument; that was used as a transmitter. They were sent through a tumbler instrument, through F, as a transmitter; and that tumbler instrument, your Honors will bear in mind, was used in a horizontal position, set just as this tumbler sets on the table, so that it transmitted these words in that position and not in any other position.

[*Mr. Hill* closed by reviewing the objections which had been made on the other side to these experiments.]

MR. CHIEF JUSTICE WAITE delivered the opinion of the court.

The important question which meets us at the outset in each of these cases is as to the scope of the fifth claim of the patent of March 7, 1876, which is as follows:

"The method of, and apparatus for, transmitting vocal or other sounds telegraphically, as herein described, by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or other sounds, substantially as set forth."

It is contended that this embraces the art of transferring to or impressing upon a current of electricity the vibrations of air produced by the human voice in articulate speech, in a way that the speech will be carried to and received by a listener at a distance on the line of the current. Articulate speech is not mentioned by name in the patent. The invention, as described, "consists in the employment of a vibratory or undulatory current of electricity, in contradistinction to a merely intermittent or pulsatory current, and of a method of, and apparatus for, producing electrical undulations upon the line wire." A "pulsatory current" is described as one "caused by sudden or instantaneous changes of intensity," and an "electrical undulation" as the result of "gradual changes of intensity exactly analogous to the changes in the density of air occasioned by simple pendulous vibrations."

Among the uses to which this art may be put is said to be the "telegraphic transmission of noises or sounds of any kind," and it is also said that the undulatory current, when created in