

England, in 1874, which clearly shows a selector substantially like the Cummings patent. But that device of Kelly was limited, and adapted to but two signals in connection with a single switch, while the complainant's device is adapted to two or more; and the complainant insists that this relieves his invention from the charge of anticipation as evidenced by the Kelly patent. It was insisted upon the argument that all that Cummings had done by his alleged invention was to increase the capacity of the Kelly device, so that it should be operative upon more than two signals, and that such increase of capacity was not the result of inventive skill, but only such as would be devised by any mechanic skilled in the art. Without attempting to discuss the invalidity of the Cummings patent for this reason, it is sufficient to say that the admitted state of the art compels its strictest construction, and, when so construed, I think the apparatus constructed by the defendant and alleged to be an infringement is so clearly differentiated from the complainant's device as to relieve it from the charge of infringement. Thus, in the Kelly apparatus and in the Cummings apparatus the signal rods move laterally to engage and disengage them with and from the shifting bar. In the defendant's apparatus the signal bars are moved vertically to accomplish the same result. In the Kelly apparatus and the Cummings apparatus the signal rods move in the same plane during their engagement and disengagement. In the defendant's apparatus each signal rod moves in a plane peculiar to itself, and different from the planes of all other signal rods, in engaging and disengaging. In the Kelly apparatus and the Cummings apparatus the signal rods are connected by horizontally moving links. In the defendant's apparatus the signal rods are wholly unconnected with each other. In the first and second claims of Cummings' patent the signal rods are described as moving laterally, and are limited to such. The defendant's apparatus has no laterally moving rods. Other differences are also apparent, but I think sufficient number have been particularized to take the apparatus of the defendant, which, by the way, is itself protected by letters patent, beyond the claim of the alleged infringement. The two devices having, indeed, a common object, are so dissimilar, and are operated so differently, that they must be regarded as different inventions; or, if not so regarded, at least must be held to be simply an increase of capacity of the Kelly apparatus, easily made by any one skilled in the art.

Arriving at this conclusion, the necessary result is that the bill must be dismissed.

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BRUSH ELECTRIC CO. et al. v. MILFORD & HOPEDALE ST. RY.  
CO. et al.

(Circuit Court, D. Massachusetts. September 21, 1893.)

No. 3,085.

**PATENTS FOR INVENTIONS—INFRINGEMENT—BRUSH SECONDARY BATTERY.**

The Usher secondary battery, in which are combined a support plate, a porous medium, and an active material mechanically applied to the

plate, contains all the features of and infringes the patent for the Brush secondary battery, (No. 337,299,) though the form of the plate and the lead foil wrappings about the active material in the Usher battery are new.

In Equity. Bill by the Brush Electric Company and others against the Milford & Hopedale Street-Railway Company and others for infringement of the Brush letters patent No. 337,299. Heard on motion for preliminary injunction. Granted.

Witter & Kenyon, Charles E. Mitchell, Bentley & Blodgett, and Frederick P. Fish, for complainants.

Edmund Wetmore, William B. H. Dowse, William S. Hall, and Louis D. Brandeis, for defendants.

COLT, Circuit Judge. The Brush patent No. 337,299 for improvements in secondary batteries has been sustained by the courts in several cases. *Electrical Accumulator Co. v. Julien Electric Co.*, 38 Fed. Rep. 117; *Brush Electric Co. v. Julien Electric Co.*, 41 Fed. Rep. 679; *Brush Electric Co. v. Electrical Accumulator Co.*, 47 Fed. Rep. 48; *Id.*, 1 U. S. App. 320, 2 C. C. A. 682, 52 Fed. Rep. 130; *Brush Electric Co. v. Accumulator Co.*, 50 Fed. Rep. 833. Relying on these prior adjudications, the plaintiffs now ask for a preliminary injunction against the defendants. In opposing this motion the defendants do not attack the validity of the Brush patent, but rest their defense on noninfringement. The question, therefore, presented by this motion is whether the defendants' battery is within the Brush patent.

It may be observed at the outset that, while Brush has taken out a number of patents relating to secondary batteries, the patent in suit is for his broad invention. In the contest between Brush and Faure as to which was entitled to claim this broad invention it was decided that Brush was an original inventor, and the first in this country.

To pass intelligently upon the question of infringement raised by this motion we must first understand what the Brush invention is, and the position it occupies in the art. In this inquiry I shall adopt the conclusions reached by the courts of the second circuit in the cases already cited. A secondary battery is a battery which has no original power of developing a current of electricity, and is active only when rendered so by sending a current elsewhere generated through it. When such a battery is charged from an outside source, as from a dynamo machine, it becomes capable of giving back a current due to the energy which has been stored in it. A primary battery is a chemical generator of electricity, which is active only by virtue of the materials of which it is composed. "The two differ as a spring differs from a reservoir," as was aptly said by Judge Coxe in the first *Julien* Case. In a secondary battery the electrodes are of the same materials, and electro-motively similar, and the plates are insoluble in the battery fluid. In a primary battery the electrodes are of different materials, and differ electro-motively, and the positive plate is dissolved in the battery fluid. The capacity of a primary battery to give a current is limited, and it is soon exhausted, while in a secondary

battery the amount of current depends upon the amount of resistance of the conducting wires discharging it, and it may be charged and discharged an indefinite number of times. It is true that a primary battery which has become exhausted may be partially restored by sending a current through it in a reverse direction from an independent source of electricity in the same manner substantially as a secondary battery. It is also true that there are certain structures which occupy a debatable ground between these two types of batteries. But at the same time the distinctions between the two classes are well known and recognized in the art, and it is important to bear in mind that the Brush invention belongs to the class of secondary batteries.

Gaston Plante, about 1860, first gave to the world a practical secondary or storage battery. Plante took two thin sheets of lead, immersed them in an electrolyte of dilute sulphuric acid, connected them respectively with two poles of any suitable source of electricity, and passed a current through them. This developed oxygen on one lead plate and hydrogen on the other. The hydrogen passed off in bubbles, leaving the plate practically unaffected; but the oxygen combined chemically with the lead of the other plate, and formed a film or skin of peroxide of lead of a finely divided granular character. This coating of peroxide operating to protect the underlying lead soon stopped the action of the oxygen on the lead. The current was then stopped. It was found that the two plates, one covered with a thin film of peroxide of lead, and the other consisting of metallic lead, were capable of discharging a minute quantity of current. This power of discharge was lost if the plates were allowed to stand any time before discharge, and was too small to be of any practical value. Upon investigating these phenomena, Plante discovered that this loss of discharging power was due to local action between the peroxide film and the underlying metallic lead of the plate, whereby the oxygen, by corroding more of the plate, added to the thickness of the film, which now became not peroxide, but a lower oxide. He also discovered that a thicker film on one plate was useless without there was a corresponding film of equal thickness on the other plate. In order, therefore, to produce the granular or spongy film on the other plate, he conceived the idea of reversing the current of the charge, which resulted in developing oxygen on the former hydrogen plate, thereby producing a layer of peroxide on its surface, and hydrogen on the former oxygen plate, which robbed the oxide film of its oxygen, and left it metallic lead, but granular or spongy in physical structure. This second charge was continued as long as the first, followed, as before, by a period of rest. Then a third charge followed in the same direction as the first, and another period of rest; and so on, charge, rest, and reversal followed charge, rest, and reversal for days and weeks, the charges gradually increasing in length as the layers increased in thickness. These layers constituted the active material of the battery, and they were formed by a disintegration of the surface of the solid lead plate through electrical action. It took weeks or months before a layer of

active material could be obtained of sufficient depth for practical purposes, and the process became known as the Plante "forming" process. This battery was open to several objections. It took a long time to "form" the plates, and the expense involved was large. The capacity of the battery was small, and it quickly wore out.

Having investigated the Plante battery, Brush conceived the idea of taking a quantity of oxide of lead or active material and applying it directly to the lead plates before immersion in the battery fluid. This dispensed with the tedious process of "forming" such coatings out of the substance of the plate by electrical treatment, and also provided a larger quantity of active material than was practicable under the Plante method. In his patent Brush declares that his invention consists in a secondary battery element or electrode composed of a suitable plate or support, primarily coated or combined with active material, and in the method of constructing such electrodes by mechanically coating or combining suitable plates or supports with active material. The patent describes the plates as plain, corrugated, ribbed, honeycombed, or studded. They may have grooves or depressions or slots or perforations extending through the plate. The oxide of lead or active material may be retained in position on the plate by a sheet of heavy paper or equivalent substance, secured to the plate in any suitable manner by rivets or binding strips, or the lead oxide may be spread on the plate, and made to adhere by applying pressure. When a pair of these plates are associated together to form a secondary battery, and immersed in dilute sulphuric acid, and charged by the passage of an electric current in the usual manner, one of the plates has its coating peroxidized and forms the oxygen element of the battery, while the other plate has its coating of oxygen reduced to the metallic state, and then absorbs hydrogen, and so forms the hydrogen element of the battery.

The specification then declares:

"I would have it understood that I do not restrict myself to any particular form of active or absorptive material, or to any particular method of applying it to or combining it with the plate or support, as my invention consists, broadly, in a secondary battery plate or element having active or absorptive material primarily and mechanically applied thereto or combined therewith, as contradistinguished from a plate of element having the active material produced by the disintegrating action of electricity, as in the well-known Plante process."

This patent is for the broad invention of Brush. It consists of a secondary battery electrode in which the active material is mechanically applied to a support plate. It was an improvement of the Plante method. It starts, as Plante did, with the plate; but instead of obtaining the active material from the disintegration of the plate itself by the slow process of forming, Brush purchased the active material, and applied it directly to the plate. He provided three ways in which this could be done. If a plain plate is used, the active material may be held in place by a sheet of porous nonconducting material, like blotting paper. If a receptacled plate is used, the active material may be rammed or

pressed into the receptacles. The patent also states that the porous sheet may be used in the case of receptacled plates. The Brush invention is simple and easily understood. There is (1) the supporting plate; (2) the active material mechanically applied thereto; (3) the active material held to the plate by pressure, or by a sheet of porous, nonconducting material. It is the combination of these elements in the formation of a secondary battery which is covered by the patent in suit. By this means Brush produced the first commercial storage battery ever made.

It has been held in the prior adjudications on this patent that batteries of the primary type are not anticipations of Brush, because the two classes of batteries are different in construction, mode of operation, and result. It has also been held that secondary batteries of the vessel-support type like the Percival do not anticipate Brush, for the reason that they have no support plate; the very purpose of that type of battery being to do away with every form of supporting plate. It has further been decided that this invention is not anticipated by the Brush Italian patent, because, among other reasons, the plates described in that patent were specially prepared for the purpose of more rapidly forming active material thereon by the Plante method of disintegration. The invention of Brush is thus described by Judge Coxe:

"Mr. Brush was the first in this country to hold absorptive substance, in the form of dry powder, in place on the supports of a secondary battery by paper or equivalent material, and the first who rammed or pressed it into grooves or receptacles in the plates." *Brush Electric Co. v. Electrical Accumulator Co.*, 47 Fed. Rep. 48, 49.

But, while holding that Brush was entitled to this broad invention, it was decided that certain specific constructions belonged to others; that Faure was the first inventor of the application of the active material in the form of paste, paint, or cement, and that Brush was not the first to make the plate with perforations extending through it.

It is necessary now to examine defendants' battery, and to determine whether it contains the Brush invention. The Usher battery, used by defendants, consists of a plate in the form of a rectangular frame or grid, with vertical and horizontal ribs. Inclosed and held between the ribs are packages of active material, having a wrapping of thin sheet lead. The wrapping is perforated, and the perforations filled with gum. The packages are filled with active material in the form of powdered oxide of lead, commercially known as red lead. Thin sheets of kiln-dried wood separate the plates. The plates and sheets are held together by rubber bands, and are set in a receptacle of hard rubber containing dilute sulphuric acid. In structure, certainly, this battery appears to have the elements of the Brush invention,—a support plate combined with mechanically applied active material, the plates being separated by sheets of porous nonconducting material. It is insisted, however, by defendants that the plate of the Usher battery is not a support plate; but why, it is difficult to see. It certainly acts as a support for the active material. When the packages of red lead are inserted in

the receptacles of this plate, they come in contact with, and are held by, the ribs of the plate. In his patent of August 16, 1892, Usher says, "I first prepare a metallic skeleton plate." This plate has two functions,—to support the active material, and to conduct the current. It is not analogous to the conducting plate of a vessel-support battery, where the active material is placed in and supported by a vessel. Usher starts to build his battery with a plate, and then proceeds to support his material upon it just as Brush does. He does not take a vessel, and pour his active material into it. "Support," in the sense of the Brush patent, does not mean that the active material must be wholly supported on the surface of the plate in the form of a coating, as in the case of a plain plate. The patent expressly refers to receptacled or slotted plates as well as plain plates, and declares that the active material "may be primarily coated or combined" therewith. The word "combined," in the Brush patent, is entitled to the same consideration as the word "coated," and it would be just as unreasonable to eliminate one as the other from the patent. To my mind, it is perfectly clear that the skeleton plate of the Usher battery is a support plate within the meaning and language of the Brush patent, and that it is constructed and used for identically the same purposes as the Brush plate.

Again, the Usher plates are separated by sheets of porous material in the form of kiln-dried wood. These sheets help to support the active material upon the plates, just as the sheets of porous blotting paper in the Brush battery. Brush does not confine the use of this porous medium to plain plates, but specifically states that it may be used with receptacled plates. The fact that the Brush battery of commerce is constructed without this porous medium, and that this is considered an inferior form of construction, does not make it any less a part of the Brush invention. In the Brush battery, as ordinarily constructed, the active material is applied to the plate by pressure. This leads the defendants to declare that the Brush invention is limited to the use of some kind of pressure, and that Usher does not use any pressure. A glance at the Brush patent shows the unsoundness of this contention. He states in his patent that the active material may be applied to the plates in two ways,—by interposing a sheet of porous material between the plates, or by spreading a quantity of material upon the plate and applying pressure, in which case no porous medium is necessary.

It is further urged by defendants that the active material of the Usher battery is new, and unknown before, and that it is not the active material of the Brush battery. They assert that the oxide of lead in the Usher battery does not become the active material of the battery until it has passed through their forming or charging process, when it develops into a new and powerful peroxide. This is the only way they can account for the superior efficiency of the Usher battery. The answer of this is that when the defendants take a quantity of finely divided oxide of lead, such as Plante produced by the disintegration of the plate, and which is known and understood in the art as "active material," and apply it directly to a supporting plate, to form the electrode of a secondary battery, they have ap-

propriated the invention of Brush; and it is useless, for the purposes of this case, to make any further inquiry. But it is significant in this connection that Usher, in his two patents for improved storage batteries, introduced in evidence by plaintiffs, calls the oxide of lead contained in his packages "active material." The only difference in this particular between Usher and Brush is that the former incloses his active material in perforated lead wrappings. This may or may not be an improvement. As to the theory of a new active material, I am inclined to believe that the Usher battery does not develop any new peroxide, and that the phenomena of gradually increasing power and greater ultimate efficiency which are said to characterize its operation are due to the obstruction which is offered to the action of the electrolyte by the lead covering surrounding the active material, and the use of a greater quantity of such material in the packages. This hypothesis is at least more reasonable than to suppose that some unknown chemical action takes place which is foreign to the Brush battery.

There is little force in the argument of defendants that the Usher battery belongs to the vessel-support type like the Percival battery, and is, therefore, not within the Brush patent, because it is apparent on inspection that it does not belong to that class. The distinguishing feature which marks the difference between the two classes of batteries is the support plate. In the Percival there is no support plate, either plain, perforated, or skeleton, but the active material is placed in a vessel divided into two parts by a porous nonconducting partition. In the Usher battery there is clearly a support plate carrying the active material. Usher starts with a plate, not a vessel, for the support of his active material, just the same as Plante and Brush. This feature removes the Usher battery from the vessel-support type, and it becomes a plate-support battery of the same type as Brush. The De la Rive battery described in the *Electrician* in the year 1863 was of the vessel-support type. The Usher battery is not a development of this type. Usher built upon Plante and Brush, not upon Percival or De la Rive. Nor is the Usher battery allied to the Brush Italian patent, for the same reasons that the Italian patent was held by the courts of the second circuit not to contain the invention covered by the patent in suit.

I find, therefore, in the construction of the Usher battery, the combination in a secondary battery of a support plate, porous medium, and active material mechanically applied to the plate. This is the Brush invention. The special form of the plate, and the lead foil wrappings about the active material, may be new with Usher, but at the same time this battery contains all the features of the Brush invention.

But it is strenuously urged by defendants that the mode of operation of the Usher battery is radically different from Brush. They say that the Brush battery is an improvement on Plante, and that the improvement consists in getting rid of the forming process. They contend that their electrodes are "formed," and that, therefore, they do not use the Brush process. I am unable to

accept this theory. The defendants take a body of red lead, or active material, and apply it to a supporting plate. This active material is already formed, within the meaning of the Brush patent. In no proper sense do they form it as Plante did, from the disintegration of the plate itself by repeated charge, rest, and reversal. It may be true that the thin lead covering prevents for a time the battery fluid from reaching the active material, so that it requires more time to charge the battery, and the battery may not reach its maximum power until the lead covering on the oxygen plate has become thoroughly disintegrated by repeated charges, but this falls far short of the forming process in the Plante sense. It may rather be said to be a retarded charging process. Assuming that the Usher battery does not reach its maximum efficiency until it has been in use for some time, while the Brush battery attains its greatest power when first put into use, this difference in operation is due to the modification in structure already pointed out, and it is not brought about by any new departure from the Brush method.

It is also urged that the Usher battery produces new and useful results. One of these results is that it avoids injurious sulphation. Where sulphuric acid is the battery fluid, there will be more or less formation of sulphate of lead, due to local action. This sulphation tends to destroy the life of the battery, and causes the active material to fall away from the plates. Assuming that this evil exists to a less extent in the Usher battery only shows that Usher may have improved upon Brush, but it does not prove that the Brush invention is absent from the Usher structure.

And the same reply may be made to the alleged greater efficiency of the Usher battery. This is no answer to the charge of infringement, if it is clear that Usher has incorporated into his battery the Brush invention. I am not fully convinced of the great superiority of the Usher battery. If, as contended by the defendants, it has solved the problem of a practical storage battery for tramways, (a field in which it is said the Brush battery has only met with failure,) it seems strange that such an important discovery, worth, we are told, many millions of dollars, should not have become more widely known, and put into operation on a more extensive scale.

As to the Johnson battery, it is sufficient to say that, if the Usher battery infringes Brush, the same must be true of Johnson. The defendants have given up the use of the Johnson battery, and the only real contest on this motion has been upon the Usher battery.

I do not think it necessary to consider at length the prior invention of Dr. Blanchard, introduced by the defendants for the purpose of limiting the broad claims of the Brush patent, rather than as an anticipation. It may be observed, however, that the Blanchard invention relates to a battery of the primary type; that it never served any practical purpose, and seems to have been soon abandoned. It further appears that this evidence was



before Judge Green in the New Jersey case, and also formed the subject of a petition and motion in one of the New York cases. The first claim of the patent is as follows:

"(1) A secondary battery element or electrode consisting of a plate or suitable support primarily coated or combined with mechanically applied active material, or material adapted to become active, substantially as set forth."

Claim 2 sets forth a secondary battery electrode whose support is provided with a coating or surface layer of absorptive substance, such as metallic oxide, which is applied thereto. Claim 3 specifies the active material as oxide of lead or equivalent lead compound. Claim 6 is as follows:

"(6) A plate of suitable support provided with grooves, perforations, or receptacles, and primarily coated, combined, or filled with mechanically applied active material, or material adapted to become active, substantially as set forth."

Claim 7 limits the active material applied to the grooves or perforations of the plate to oxide of lead or equivalent lead compound. Claim 9 is as follows:

"(9) The combination, with the plate or support of an electrode and an active spongy layer thereon, of a porous medium for holding said layer on the plate or support of the electrode, substantially as set forth."

Claim 10 includes as an element the fastening together of the support with its active material and holding medium. Claim 12 is as follows:

"The method of making plates or electrodes for secondary batteries, consisting in primarily combining active material with suitable plates or supports mechanically, in contradistinction to forming the active material by an electrical disintegration of the plate or support, substantially as set forth."

I am of opinion for the reasons given that the defendants' battery infringes these claims of the Brush patent, and that an injunction should be granted.

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HOYLE et al. v. KERR.

(Circuit Court of Appeals, Third Circuit. November 3, 1893.)

No. 2.

PATENTS FOR INVENTIONS—ANTICIPATION—WOVEN FABRICS.

The Kerr patent, No. 353,790, for a woven fabric, in which a variety of shades are produced in the pattern by a new way of interweaving the warp and weft threads,—a binder warp thread being placed in the center of each pair of figuring warp threads, and utilized for shading purposes; the weft threads also appearing on the surface, and producing a color effect,—was not anticipated by a fabric in which, at some places, the figuring warp threads were drawn in pairs, with a binder warp between, but which did not appear on the surface, or produce a color effect, and in which the weft threads were also purposely hidden from sight, the whole surface being formed by the two figuring warp threads. Nor was the invention anticipated by a fabric having three figuring warp threads to each binder warp, and in which, consequently, a binder warp