

tors"—per Lord Justice James in *ex parte* Waller, 17 Chan. Div. 756. It is the debtor's estate and not the estate of any third person. The purpose and object of the statute is to distribute amongst the creditors of the bankrupt in satisfaction of his debts his estate and property, and not that of anybody else who is not within the purview of the statute.

The effect of the construction contended for by the respondent, and adopted by the majority of the Court below, would be the distribution, not of the bankrupt's estate which his creditors might have rendered liable to the payment of their debts, or which he might honestly and without fraud have parted with to them in satisfaction, but of the property of the *cestuique* trust to which the trustee could only have created a title in a third person by fraud, and which his personal creditors could not have in any way attached or rendered liable to the payment of their debts.

This construction would involve the great injustice of applying one man's property in satisfaction of another man's debt. Whereas the other construction is free from any such injustice, and is quite consistent with the fair object of the Act, which is to free the bankrupt upon taking from him and giving to his creditors everything which might have been rendered available for the payment of their debts.

The only possible injustice which such a construction might give rise to, would be in the case of any creditor who had given credit to the bankrupt upon the faith of the apparent title vested *ex facie* in the bankrupt; but as my noble and learned friends Lord Watson and Lord M'Laren in the Court of Session have both dealt with that point, I will only add that in other Bankruptcy Statutes reputed ownership clauses have been expressly included in the scheme of distribution in order to deal with that possible evil in the case of moveables, but have not, that I am aware of, extended the provision to heritable estate. It seems to me, therefore, that heritable subjects of which the bankrupt is a bare trustee do not pass by the warrant of confirmation.

I have thus far dealt with the case solely upon general principles of construction, and have not adverted to the numerous authorities cited at the bar and commented upon by the Lords of Session in their various judgments. It has been my duty to examine them, but my noble and learned friends have so fully placed them before your Lordships and commented upon them so exhaustively, that it is quite unnecessary for me to say more than that I concur in the view taken of them by them, and by Lord M'Laren who dissented from the interlocutor appealed from.

I concur in the motion proposed to your Lordships.

Their Lordships decided that the interlocutor appealed from should be reversed, and that it should be declared that the subjects in question did not pass to the respondent, and that the appellants, as

beneficial owners, were entitled to the sum consigned in bank; and that the respondent should pay the costs of this appeal.

Counsel for the Appellants—H. Johnston—Goudy. Agents—A. Beveridge, for Watt & Anderson, S.S.C.

Counsel for the Respondent—Lorimer—Hunter. Agents—Keeping & Gloag, for Morton, Smart, & Macdonald, W.S.

Tuesday, April 5.

(Before the Lord Chancellor (Halsbury), Lord Watson, Lord Herschell, Lord Macnaghten, and Lord Field.)

ANGLO-AMERICAN BRUSH ELECTRIC LIGHT CORPORATION *v.* KING, BROWN, & COMPANY.

(*Ante*, vol. xxvii. p. 963, and 17 R. 1267.)

Patent—Validity—Infringement—Prior Publication.

A specification which described a process in a manner clear and intelligible to men of education and technical knowledge of the subject, and capable of giving instructions for the making of the machines—*held* to be sufficient publication to invalidate a subsequent patent for the same process.

Patent—Validity—Prior Use.

Where an electric machine was constructed and set up in the works of general engineers, who employed it on one occasion for photographic purposes, and on another occasion to light apparatus with which they were making experiments for their ordinary business, that was *held* to be sufficient prior public use to invalidate a later patent for a machine of the same type.

This case is reported *ante*, vol. xxvii. p. 963, and 17 R. 1267.

The defenders appealed.

At delivering judgment—

LORD CHANCELLOR (HALSBURY) — My Lords, this is an appeal against an interlocutor of the First Division of the Court of Session affirming the interlocutor of the Lord Ordinary setting aside the patent, of which the appellants are the assignees, on the ground that the portion of the invention patented (with which under the circumstances it is alone material to deal) had been previously published.

The patent so set aside is known as Brush's patent, and bears date the 16th of November 1878, and the question in debate is, whether a patent taken out by Mr Samuel Alfred Varley in 1876 does or does not so anticipate the patent of 1878, of which the appellants are the assignees, as to make the latter patent bad?

The patent has relation to the particular form of dynamo-electric machines, all of

which have, and were known to have before the date of either patent, this principle in common, that they move magnets past coils of wire or coils past magnets with sufficient velocity to produce the desired result.

It was also familiar knowledge before the date of either patent that a current of electricity sent round a bar of soft iron would render the bar of iron magnetic.

Undoubtedly the progress of electrical science has given rise to various forms of using that energy in which the two principles to which I have adverted have become important, and the practical application of them by means of different mechanical devices has for some time past exercised the ingenuity of practical electricians.

One appears to have been the idea of making one wire go round the iron bar, make it and maintain it as a magnet, making the same wire go to perform whatever work it was intended to perform, and returning to the magnet, and thus the single current doing two things.

The further step was made when what was called the "Shunt" apparatus was invented. The current of electricity was divided into two. One stream, so to speak, was made to go round the iron bar, keeping it magnetic, while the other was led to do the work which it was required to do, and were rejoined after the work had been accomplished.

Mr Imray explains with great clearness what are the two principles called "Series" and "Shunt" winding.

On the machine being revolved, he says, a wire wrapped round and round the magnet crosses over to another magnet, proceeds to do whatever work is required of it in what is called the external or working circuit, and goes back again after doing the work.

It is called "Series" winding, because the coils of the electro-magnet are in series with the external circuit—that is to say, it is one continuous wire. The current goes straight from start to finish. The whole electricity produced by the machine goes to excite the magnet and to the external wire, and straight from the one to the other.

The weak point of it (said Mr Imray) is this—that as soon as you break the external circuit you will cease to have an electric machine, because there is no current. In electrical language, that is spoken of as having the external circuit opened. When the external circuit is broken or opened the current ceases to flow, and you do not have the advantage of any magnetising action by the current going around the magnets of the machine.

In the same way, the more resistance you put in your external circuit—that is to say, the more work you ask your machine to do, the less current will flow through the external circuit, and the more work you have, the less you will be doing towards the magnetising of your machine. Resistance in wire mainly depends, first, upon the character of the wire and what metal it consists of; secondly, upon its transverse

section; and thirdly, upon its length. The longer the wire the greater the resistance; the smaller the section the greater the resistance; one kind of metal has more resistance than another. Roughly speaking, a short thick wire has much less resistance than a long thin one.

Another form is what is called "Shunt" winding, in which the difference is simply in the disposition of the wires. The current coming away is split into two. One portion of it goes to what has been called the external circuit, doing whatever is to be done, and having done that work returns to the machine, but without any actual contact with the magnets of the machine at all. The other portion goes straight to the magnet, is wrapped round it as before, and then returns to the brush, as it is called, without any contact with the external circuit at all.

The strong point (says Mr Imray) of this arrangement is that whether the external circuit is opened or closed, there is always magnetism in the wire capable of producing electricity, because the current is continually running through the "shunt" to the magnet. A defect in it is that some of the electricity is taken away from the external circuit which otherwise would go through it.

One further explanation of Mr Imray's becomes necessary to follow the question with which your Lordships have to deal, and that has reference to what Mr Imray says is variously known as "electro-motive force," "tension," "pressure," and "potential."

"Potential" seems to be the word generally used, and means the intensity of pressure by which the electricity is caused to pass along a conductor.

The advantage of what is called a compound winding, which is neither more nor less than a combination of the two previously described, the first being known as "Series," the second as "Shunt," and the one in debate as "Series-Shunt," or compound winding.

The advantage of the arrangement is in producing a constant pressure, or an equal volume, or an even current. It is difficult, except by finding analogies in other subjects of physical research than electricity, to convey the exact idea, but the advantage attained at all events is, that when the work is changed in the outer circuit the amount of current that goes round the magnet is so changed that one compensates—or nearly compensates—for the other.

Now, in the patent patented in 1876 Mr Varley says—"Part of the electricity developed by the machine is diverted" (and the word is significant) "to maintain the magnetism of the soft iron magnets, and the remaining portion is used to produce the electric light. There are several well-known ways of doing this" (this has been the subject of very violent comment), "but the method I prefer is to wrap the soft iron magnets with two insulated wires, one having a larger resistance than the other. The circuit of larger resistance is always

closed, and the circuit of less resistance used for the electric light. When the electric light is being produced, the greater portion of electricity passes through the circuit of less resistance, which I term 'the electric light circuit,' maintaining the magnetism of the magnets and producing the light. When the electric light circuit is opened from any cause, the electricity developed passes through the circuit of greater resistance only, and maintains the magnetism of the magnets."

It is impossible to deny that in the present state of electrical knowledge dealing with dynamos, that the description given undoubtedly does disclose to anybody familiar with the principle of electro-dynamos and the medium by which the electric current is turned to account, the very thing for which the patent was granted to Mr Brush.

But it is said that for the purpose of judging of the novelty of the invention of 1876 one must, as nearly as one can, apply oneself to the knowledge existing at that date, and not apply what we have learned since, so as to interpret the language of the patent of 1876 by the light of later discoveries.

I am not quite certain that I understand the application to this case of that principle of interpretation, which, however, I admit to be sound. The "Series" was known, the "Shunt" was known, and the language seems to me incapable of any other interpretation than that the patentee did mean to combine the two previously known systems. If he did, and disclosed the mode of doing it, the novelty of the later patent cannot be supported.

I confess that I am unable to entertain a doubt that it was so disclosed. What he intended was, I think, conclusively shown by the original rough sketch produced. Distinguished electricians cavil at the mode of its disclosure, criticise the language (which is not, perhaps, the most felicitously chosen), and possibly suggest doubts as to what would have been the fate of Mr Varley's patent if it had been attacked upon the ground of the insufficiency of the specification; but that is not the question to be determined here.

The question is the disclosure of the invention, which consisted in the combination of two known forms of dynamo-electric machines.

I doubt whether there is much to choose in clearness of exposition between the one patent and the other. I think it is certain that neither the one patentee nor the other had any very definite notion of the importance of the invention until a year or two later.

The invention of the incandescent light brought into prominence the importance of an even, uniform, and continuous flow of the electric energy.

I am therefore of opinion that the interlocutor appealed from ought to be affirmed.

I have confined myself, however, in arriving at this conclusion, to the specifications themselves, aided by scientific witnesses, in interpreting the scientific nomenclature

in which the specifications are couched, and the explanations of the witnesses as to the operations produced by the different forms adopted.

I designedly avoid giving any opinion upon the question of the user of Varley's machine. Many questions, to my mind, arise as to what publication there was from the use of that machine as a machine disclosing the mode by which the electric light was produced. But inasmuch as I have come to the conclusion that I have indicated, it is not necessary further to discuss the extent to which the use of the electric light by means of Varley's machine for the purpose of illustrating some submarine invention was such an exhibition or publication of it as would make a subsequent patent void.

I therefore move your Lordships that the interlocutor appealed from be affirmed, and this appeal dismissed with costs.

LORD WATSON—My Lords, the appellants are assignees of Brush's patent of 1878 for improvements in apparatus for the generation and application of electricity for lighting, plating, and other purposes. The patent originally included two different dynamo-electric apparatus, now known respectively as the shunt and the series-shunt; but in 1882 the appellants, having become aware of the fact that their shunt-winding machine had already been fully described and claimed in Clark's patent of 1875, amended their specification by disclaiming that part of it which related to shunt-winding, and limiting their claim to the series-shunt.

In this appeal they complain of a decision of the First Division of the Court of Session affirming an interlocutor of the Lord Ordinary (Trayster), by which he reduced and set aside their letters-patent as amended by disclaimer, on the grounds, *inter alia*, that the series-shunt apparatus therein described had been published in Varley's patent of 1876, and also that there had been prior public user.

Dynamo-electric machines are useful for various kinds of work, but are now chiefly employed for producing light. I shall, in so far as it may be necessary to describe such machines, refer to them as if they were used for the latter purpose.

At the date of Clark's patent the only known variety of self-exciting dynamos was the series-winding apparatus in which the current of electricity generated in the revolving coils, after it had passed through the commutator, is conducted to and round the magnets, and thence to the lamps, from which it returns to the machine, thus forming a single electric circuit, which performs the double function of magnetising the magnets and doing work. In the shunt apparatus the volume of electricity, after it has passed the commutator, is divided into two unequal currents by means of a shunt, or bifurcation of the conducting wire, which is in itself a common device. The smaller current is then made to circulate round the magnets, whilst the larger is led to the lamps, and they are again united

just before they re-enter the machine. So that these currents form two separate circuits, that of greater resistance maintaining the supply of electric force in the magnets, and that of lesser resistance producing light.

The series-shunt-winding apparatus is, as its name imports, a combination of the two systems already described. Its arrangements are practically the same with those of the shunt-winding machine, subject to this modification, that after bifurcation, the larger current, instead of being taken direct to the lamps, is in the first instance made to encircle the magnets. Accordingly the smaller current serves for excitation only as in the shunt system, whereas the larger current serves both for excitation and for work as in the series-winding system.

Whether the series-shunt system was first disclosed to the public by Varley in 1876, or by Brush in 1878, it seems to be certain that the real merit of the arrangement was neither understood nor appreciated until the subsequent discovery of the incandescent lamp. The efficiency of light produced by the incandescence of filaments of carbon depends upon the maintenance of a uniform and steady flow of electricity in the working circuit, which is now termed a constant potential. In the series, and also in the shunt system, the working current is liable to considerable variation, with this difference, that the same disturbing elements which in the one case cause a decrease, in the other occasion an increase of electro-motive force. The combination of these opposite tendencies brings into play the principle of compensation, and makes it possible, by careful adjustment, to attain a more constant potential with the series-shunt than with either of its component systems.

The terms of Brush's specification indicate that the patentee had not in his view the attainment of that high degree of constancy in the motive force which is desirable for the purpose of incandescent lighting. He points out that other machines were "not well adapted for certain kinds of work, notably that of electroplating," and then proceeds to describe his own in these terms—"I attain my object by diverting from external work a portion of the current of the machine, and using it either alone or in connection with the rest of the current for working the field magnets. I prefer the latter plan of the two, especially for electroplating machines." In other words, he attains his object by using either the shunt or the series-shunt, but prefers the latter for electroplating. For other purposes than electroplating he does not suggest that the one system is in any respect greatly preferable to the other. As matter of fact, it appears to be doubtful which of the two is most suitable for plating. Mr Preece, one of the appellants' skilled witnesses, says—"Pure shunt is preferred in England for electroplating. In America the compound is preferred."

In Varley's patent of 1876 no claim is made either for shunt or for series winding.

The passage which has been held by both Courts below to anticipate the invention claimed by the appellants is merely descriptive of the machines to which the arrangements claimed by Varley may be usefully applied, and is in these terms. [*His Lordship read the portion given above in Lord Halsbury's opinion.*]

In estimating the real significance of Varley's specification it is necessary to consider what amount of information with respect to dynamo-electric apparatus ought to be attributed to persons who had an opportunity of reading it in the year 1876. The language used by the patentee must be construed with reference to the information then open to the public, and not in the light of subsequent discoveries. To my apprehension it does not admit of doubt that a reader acquainted only with series-winding might not attach the same meaning to the words used by Varley as would naturally occur to one who was also familiar with the shunt, or with the shunt and series-shunt system of winding.

Since the hearing of this appeal I have carefully perused the whole evidence adduced by both parties in so far as it has any bearing upon the issue of prior publication. Of the respondents' evidence it is sufficient to say that it is in entire accordance with the decision appealed from. The appellants' evidence consists of oral testimony by electricians of great eminence, and is directed mainly if not wholly to prove (1) that on a fair construction of the specification of 1876, the words relied on by the Court of Session do not disclose either shunt or series-shunt winding, and (2) assuming them to do so, that the specification does not contain explanations or directions which would enable a workman of ordinary skill to construct either a shunt or a series-shunt machine. I need hardly say that it is for the Court and not for the witnesses to construe the terms of the specification; and that their evidence upon the first of these points is only material in so far as it may supply scientific facts which ought to be taken into account in arriving at the true construction of the instrument.

There is one circumstance which in my opinion seriously affects the value of the appellants' evidence upon both points. The testimony of their witnesses was given upon the footing that in 1876 Clark's invention of the previous year was still unknown, and that those who read Varley's specification could have no knowledge of any system other than series-winding. Upon that assumption it occurs to me that a reader, whether man of science or skilled workman, would probably have been at a loss to discover what Varley meant, and might not have arrived at either shunt or series-shunt winding without some exercise of his inventive faculty. I am, however, unable to find any good reason for holding that Clark's shunt machine was unknown in the year 1876. It is true that in 1878 Mr Brush had never heard of Clark's invention, and also that shunt-winding was unknown to Sir William Thomson before 1879. But it appears to me that Clark's

taking out a patent for his invention was, both in fact and law, a publication of it. I do not suppose that every electrician, however eminent, is by necessity personally cognisant of every invention patented within the bounds of his science; and the ignorance of two or more of them is unavailing to prove that the knowledge of others was equally defective. I cannot, therefore, avoid the conclusion that in 1876 Clark's shunt-winding machine had been disclosed to the public, and must have been known to some, if not to all electricians; and consequently that the controverted passage in Varley's specification ought to be construed on the footing that shunt-winding was known at its date.

I do not think it necessary to deal with the conflict of testimony as to the sufficiency of Varley's specification for the guidance of a skilled workman. The Lord Ordinary was of opinion that the appellants had failed to prove that part of their case. But I agree with his Lordship, and with the learned Judges of the First Division, in holding that the sufficiency or insufficiency of the specification for that purpose does not afford a crucial test of prior publication. Every patentee, as a condition of his exclusive privilege, is bound to describe his invention in such detail as to enable a workman of ordinary skill to practise it; and the penalty of non-compliance with that condition is forfeiture of his privilege. His patent right may be invalid by reason of non-compliance; but it certainly does not follow that his invention has not been published. His specification may, notwithstanding that defect, be sufficient to convey to men of science and employers of labour information which will enable them without any exercise of inventive ingenuity, to understand his invention, and to give a workman the specific directions which he failed to communicate. In that case I cannot doubt that his invention is published as completely as if his description had been intelligible to a workman of ordinary skill.

Assuming, as in my opinion I am bound to do, that Clark's invention was known in 1876, I have no hesitation in holding that Varley's specification sufficiently describes both the shunt and the series-shunt machine. The first sentence in the passage already quoted contains an accurate representation of shunt-winding. The electricity developed by the machine is to be "diverted," which is the word used in the appellants' specification to denote bifurcation into two parts, one for magnetising, and the "remaining portion" for producing light. These expressions plainly refer to a single current of electricity generated by the machine, which is to be split into two currents, one for excitation of the magnets, and one for work—an arrangement which, according to the evidence, embraces all the essential features of a shunt machine. The sentences which follow appear to me to describe the series-shunt with equal accuracy. They commence with the statement that there are several ways of "doing this"—that is, of obtaining a circuit of excitation and an electric lighting circuit from a single

current by dividing it into two portions. The method preferred is to make both circuits pass round the magnets, that of greater resistance being employed for excitation only, while that of lesser resistance excites the magnets and also does the work of lighting. The series-shunt is evidently treated as a mere modification of the shunt system; and I think it might be reasonably regarded in that light by the patentee. The alteration in the mechanical arrangement of the apparatus is in itself trivial; and the possibility of thereby obtaining such a constant potential as would at a future date suffice for the purpose of incandescent lighting was not present to his mind. There might, as one of the witnesses suggests, still remain room for a patentable improvement upon the series-shunt as described by Varley, consisting in an adjustment which would ensure a high degree of constant potential. No such possibility is indicated either by Varley or in Brush's patent of 1878.

In an argument addressed to your Lordships, counsel for the appellants laid much stress upon these words occurring in Varley's specification: "The insulated wire composing the helices is connected to the insulated wire surrounding the soft iron magnets of the machine, and is usually inserted in the circuit of greater resistance." They maintained that the necessary result of giving effect to that direction would be to deprive the apparatus contemplated by Varley of all the characteristics of a series-shunt winding. The point does not appear to have been pressed in the Courts below; at least, it is not noticed by any of the Judges. In the absence of evidence to support the appellants' contention, I have come to the conclusion that the adjustment thus indicated might affect the constancy of the volume of electricity conveyed by the electric light circuit, but that the apparatus would still be a series-shunt-winding machine.

These reasons are sufficient to dispose of this appeal; and I desire to express no opinion upon the matter of prior public user. The arguments of the appellants satisfied me that the question was one upon which I should prefer not to form any conclusion without hearing counsel for the respondents. I therefore concur in the judgment which has been moved by the Lord Chancellor.

LORD HERSCHELL—My Lords, this is an appeal against interlocutors pronounced in an action of reduction brought by the respondents for the purpose of obtaining the revocation of certain letters-patent then vested in the appellants. The letters-patent in question bear date the 18th of May 1878, and claim the invention of "improvements in apparatus for the generation and application of electricity for lighting, plating, and other purposes." The original specification concluded with sixteen claims, to only two of which I need now refer. The eighth claim is for what is termed in relation to dynamo-electric machinery the shunt system; that is to say, a dynamo-electric machine wherein

a portion of the current produced is diverted for the purpose of maintaining a permanent magnetic field. The ninth claim is for what is now termed the shunt-series system or compound winding. In January, 1888 a disclaimer was filed by which the eighth claim was abandoned, it having been discovered that the shunt system was not new at the date of the letters-patent. The main question, and indeed in my opinion the only question with which your Lordships need concern yourselves, is whether the shunt-series system was a new invention at that date. It is alleged by the respondent that it was not only communicated to the public by the specification of the letters-patent granted to Samuel Alfred Varley in December 1876, but that a machine was under his instructions constructed on that system, and had been in actual use before the date of the patent now vested in the appellants.

Varley's specification claimed a method of obtaining a high degree of "magnetic potential" in the bobbins of an electric machine, and the claim had no reference to the manner in which the electricity generated was to be employed; but there occurs in the course of the specification the following passage:—[*His Lordship read the portion of the qualification given above in Lord Halsbury's opinion.*]

It is scarcely denied that to any electrician possessed of the knowledge of the present day these words would convey the idea of the series-shunt system of winding. But it is said, and with truth, that this is not the test, and that the question is, what idea they would convey to a person reading them prior to the date of the patent which is in contest in the present suit. The learned counsel for the appellants argued strenuously at the bar that in the light of the more limited information then available such a reader would not be led to a knowledge of the device described in Brush's patent. They contended, moreover, that in other parts of Varley's specification statements are to be found which, taken in connection with the passage relied on, would lead the reader away from the conception of this scheme of compound winding. It is necessary, therefore, to inquire what was the state of knowledge prior to 1878. The system of series-winding was well known. By this arrangement the current generated is led round the magnets, and from the magnets is conducted to the lamps, or to serve the other purposes for which it is to be employed, and then back to the machine so as to complete the circuit. This device was subject to the defect that the magnetism of the magnets might be diminished at the very time when it was desirable that the current generated should be maintained. In May 1876, letters-patent were sealed bearing date the 11th of December previous, the specification of which, it is admitted, disclosed the shunt system of winding, by which one part of the current is diverted to maintain the magnetism of the soft iron magnets, whilst the remainder is used to produce the electric light, or serve any other purpose for which the

current is required. It was urged on behalf of the appellants that there was no evidence that the invention thus disclosed had become commonly known prior to 1878, or that it had ever been put in operation, and that Varley's specification ought therefore not to be construed on the assumption that those who read it would be acquainted with the shunt system of winding. I cannot accede to this view. It appears certain that at the date when he took out his patent Varley was acquainted with the shunt system, and indeed with the shunt-series system of winding, for this is conclusively established by the drawing made by him which was put in evidence. Of course, I do not refer to this for the purpose of construing his specification, but only as bearing on the question whether the shunt system was known prior to 1878. The shunt system had been described in Clark's specification of 1875, and it is impossible to say that other electricians may not have been, like Varley, acquainted with it. Under these circumstances I cannot regard it otherwise than as part of the stock of public knowledge which must be taken into account when approaching the construction of Varley's specification. Taking, then, the shunt system and the series system of winding as both known, what information ought the specification of Varley to be regarded as conveying? The words with which the important passage in Varley's specification commences appear to me to be apt to describe the shunt system. It is impossible not to be struck with the similarity of the language used to that which is to be found in the part of Brush's specification, which was avowedly describing that system. I am not much struck with the suggestion that the words "the remaining portion is used to produce the electric light" indicate that the use was to be for that purpose alone, and that this portion of the current was to play no part in maintaining the magnetism of the magnets, and that the description is therefore inconsistent with the shunt-series system. It seems to me impossible so to understand the language employed when the import of the sentences which immediately follow is considered. Indeed, it is admitted by one of the defendants' witnesses, Professor Sylvanus Thompson, that the criticism resolves itself into this, that he finds in two sentences what he might have expected to find in one. But a passage such as that with which we are dealing, in which each sentence is obviously connected with those which precede and follow, must be construed as a whole, and such a criticism as that which has been applied to it appears to me wholly inadmissible. Then it is said that although compound winding is described, it would not be understood at that time to refer to compound winding as now understood but to the winding on the magnets of two wires the current of electricity in each of which was separately excited. But the fact that it is prescribed that one of the two wires is to have a larger resistance than the other, and the statement that when the electric light is being produced "the greater portion

of electricity" passes through the circuit of less resistance, appear to me not to suggest the idea of separate excitation, but the contrary; and when the whole passage is read together this impression is strengthened. And it is admitted by the defendant's witnesses that there is at least one passage in the specification inconsistent with the idea that separate excitation was contemplated. The argument that other parts of Varley's specification would lead the reader away from the conception of compound winding was mainly founded upon this passage: "The insulated wire composing the helices is connected to the insulated wire surrounding the soft iron magnets of the machine, and is usually inserted in the circuit of greater resistance." It was argued that if this were done the circuit of greater resistance would not be always closed. This assertion is controverted. But whether it be correct or no, I do not think the words relied on would lead anyone reading the earlier part of the specification to the conclusion that the circuit of greater resistance was always closed in the face of the express statement that it was to be so. The other criticisms were, to my mind, of less weight, and I do not think that any part of the specification would divert a reader of the important passage on which the controversy has mainly turned from the idea of shunt-series winding. Sir W. Thomson, one of the defendants' witnesses, admits that it is quite probable that in 1876 a workman might have been led to series-shunt winding by Varley's descriptions. And Professor Sylvanus Thompson says: "If a workman of the present day were to read Varley's patent, I think he would read it as describing a shunt-series machine, because he would read the knowledge of the present day into it, and that would alter the meaning he attached to the language." Now, I admit the difficulty of divesting oneself of existing knowledge, and interpreting any description as it would have been interpreted when the stock of knowledge was more limited. But to anyone acquainted with the shunt and series systems, I think the same idea would be conveyed as is conveyed now. If to a person cognisant of these two systems the conception of their combination into the shunt-series system would have constituted a new departure, the case might have assumed a different complexion; but it is clear that Varley did not regard this combination as a new discovery. And I think it is impossible to read Brush's specification without seeing that when once he had arrived at the shunt system the application of it in conjunction with the series system appeared to follow as a corollary. His object was to secure a permanent magnetic field. He attained his object by means of the shunt system. His words are: "I attain my object by diverting from external work a portion of the current of the machine, and using it either alone or in connection with the rest of the current for working the field magnets." He treats the shunt-series system, in truth, as a mere modification of the shunt system, of which he believed

himself to be the inventor, though he has naturally a distinct claim to cover this modification.

The learned counsel for the appellants laid great stress on the fact that since Brush's specification the shunt-series system has come largely into use, and deduced from it the argument that it could not previously have been known. But it must be remembered that the importance of this system has only become very marked since the incandescent lamp has come into use. In connection with this form of electric lighting it is no doubt of the highest importance to secure a constant potential. And this object is best attained by the shunt-series system; the defects of each of these systems when used separately tending to counteract one another when they are used in combination. But there is not a trace in Brush's specification of this idea of a constant potential. What he was concerned to obtain was a permanent magnetic field. He expresses his preference for the combined systems, "especially for electroplating machines." It is true that a certain number—not, I think, a very large number—of Brush's machines were introduced into this country for electroplating purposes before the days of the incandescent lamp. It is, however, regarded as an open question whether pure shunt is not better for the purpose of electroplating than series-shunt owing to the possibility that the polarity of the magnets may be reversed. It would seem that whilst the latter system is more in vogue in America the former is given the preference in this country. I am satisfied that neither Varley nor Brush had in his mind the importance of maintaining a constant potential. But for the reasons I have given I think that any electrician reading Varley's specification with a knowledge of the two systems of series and shunt would have found there a description, which he would have had no difficulty in giving practical effect to, of the system of compound winding known as series-shunt.

Having arrived at this conclusion it is unnecessary to determine the effect of the use of the machine constructed under Varley's instructions, though I think it would be a matter for serious consideration whether after that use the appellants' patent could be supported.

I think the judgment of the Court below was right, and ought to be affirmed.

LORD MACNAGHTEN—My Lords, I have had an opportunity of reading in print the opinions which have just been delivered, and I only desire to say that I concur in the judgment which has been proposed, and in the reasons which have been assigned by my noble and learned friends.

LORD FIELD—My Lords, I have very carefully read and considered the evidence in this case and the authorities bearing upon the questions involved in it, and I have had the advantage of perusing the opinions expressed by the Lord Chancellor and my noble and learned friends.

I entirely agree with them that the appeal should be dismissed, and for the reasons which they have given; and even if I could succeed in stating those reasons in different, it could not be in better language.

I entertain, in common with my noble friend Lord Watson, some doubt whether the alleged prior use of the Varley machine was such as to avoid the appellants' patent, and if it had been necessary to decide that point I should have wished to have heard the argument on behalf of the respondents, but in the view I take of the case that becomes unnecessary.

Interlocutors appealed from affirmed, and appeal dismissed with costs.

Counsel for Appellants—Sir R. E. Webster, A.-G.—Moulton, Q.C.—J. C. Graham. Agents—Renshaws, for Mackenzie, Innes, & Logan, W.S.

Counsel for Respondents — Graham Murray, Q.C., Sol.-Gen. for Scotland—Daniell. Agents—Faithfull & Owen, for Davidson & Syme, W.S.

COURT OF SESSION.

Thursday, October 20.

SECOND DIVISION.

[Lord Kyllachy, Ordinary.]

ELDER AND OTHERS (ELDER'S TRUSTEES) v. ELDER AND OTHERS.

(*Ante*, vol. xviii. p. 392, and 8 R. 593.)

Succession—Trust-Settlement—Accumulation—Residue—Intestacy—Thellusson Act (39 and 40 Geo. III. cap. 98).

A testator directed his trustees to hold the whole rest, residue, and remainder of his estate, with the income arising therefrom, until the death of his wife, and upon that event to set aside out of the residue certain sums for the purpose of educational and ecclesiastical endowment; and lastly, "after all the above purposes shall have been fulfilled," he directed his trustees to apply and pay over the whole residue of his estate, if such there should be, to and for the use and benefit of such four schemes of a Church, and in such proportions, as to his trustees should appear most expedient. The testator's widow survived the period of twenty-one years after his death.

Held that as no residuary legatees had been appointed, or could be appointed until the widow's death, the income of the residue, which, in terms of the Thellusson Act, the trustees could not accumulate, belonged to the testator's heirs *ab intestato*.

Mr Thomas Elder, sometime of Leith, died upon 5th December 1869, survived by his

widow Mrs Anne Jardine or Elder. His next-of-kin were his nephews Thomas Jardine Elder, Port Elizabeth, South Africa, and John Dunlop Elder, St Boswells, Roxburghshire. By trust-disposition and settlement dated August 19th 1869 Mr Elder appointed Mrs Elder and others trustees for the following purposes—(1) Payment of debts; (2) payment of an annuity of £300 settled upon Mrs Elder by marriage-contract; (3) investment of £600 in the purchase of an annuity for his nephew John Dunlop Elder; (4) payment of legacies amounting to £3350 among certain schemes of the Free Church of Scotland and certain charitable societies in Edinburgh; and payment of a legacy of £500 to his nephew Thomas Jardine Elder. "*Fifth*) That my trustees shall hold the whole rest, residue, and remainder of my estate remaining after fulfilment of the above-written provisions, with the income arising therefrom, until the death of my wife, and shall out of such residue and income make payment of any other legacies or provisions I may leave by any writing to be hereby signed by me expressive of my will, although not formally executed: (*Sixth*) That my trustees shall upon the death of my wife set aside out of the residue of my estate the sum of £10,000, and shall either hold the same themselves or invest the same in the name of the general trustees for the time being of the Free Church of Scotland and their successors in office, or in the name of any other persons as my trustees shall think best, in trust, to apply the free interests and profits accruing annually from the said sum, after deduction of all expenses, as a provision or endowment of a Professor of Natural Science in the said New College of Edinburgh in connection with the Free Church of Scotland: . . . (*Seventh*) That my trustees shall, upon the death of my wife, apply £7000 of my remaining property to and for the erection of a Territorial Church on the principle of the late Dr Chalmers, and in connection with the Free Church of Scotland, and that in some destitute part of the city of Edinburgh or of Leith; and shall apply the further sum of £300 for a partial endowment for the minister of said church, and they shall also apply such further sum as they shall see proper for the purchase or erection of a manse for said minister in or as near to the district as possible, and I commit to the sole discretion of my trustees all the details, regulations, and provisions requisite in their opinion for carrying out the purposes specified under this seventh head: And (*Lastly*) After all the above purposes shall have been fulfilled, I appoint and direct my trustees to apply and pay over the whole residue and remainder of my estate, if such there shall be, to and for the use and benefit of such four of the Schemes of the Free Church of Scotland, and in such proportions, as to my trustees shall appear most expedient."

The amount of residue as at Mr Elder's death, subject to Mrs Elder's annuity, was £27,307.

In the year 1881 the College Committee of the Free Church called upon Mr Elder's