

Jefferson's Letter to McPherson

Letter from Thomas Jefferson to Isaac McPherson
August 13, 1813

Monticello August 13 13

Sir

Your letter of August 3d asking information on the subject of Mr. Oliver Evans's exclusive right to the use of what he calls his Elevators, Conveyers, and Hopper-boys, has been duly received. My wish to see new inventions encouraged, and old ones brought again into useful notice, has made me regret the circumstances which have followed the expiration of his first patent. I did not expect the retrospection which has been given to the reviving law. For although the 2^d Proviso seemed not so clear as it ought to have been, yet it appeared susceptible of a just construction; and the retrospective one being contrary to natural right, it was understood to be a rule of law that where the words of a statute admit of two constructions, the one just and the other unjust, the former is to be given them. The 1st Proviso takes care of those who had lawfully used Evans' improvements under the first patent; the 2^d was meant for those who had lawfully erected and used them after that patent expired, declaring they "should not be liable to damages therefor." These words may indeed be restrained to uses already past, but as there is parity of reason for those to come, there should be parity of law. Every man should be protected in his lawful acts, and be certain that no ex post facto law shall punish or endamage him for them. But he is endamaged, if forbidden to use a machine lawfully erected, at considerable expense, unless he will pay a new and unexpected price for it. The Proviso says that he who erected and used lawfully should not be liable to pay damages. But if the Proviso had been omitted, would not the law, construed by natural equity, have said the same thing. In truth both provisos are useless. And shall useless provisos, inserted pro majori cautela only, authorize inferences against justice? The sentiment that ex post facto laws are against natural right, is so strong in the United States, that few, if any, of the State constitutions have failed to proscribe them. The federal constitution indeed interdicts them in criminal cases only; but they are equally unjust in civil as in criminal cases, and the omission of a caution which would have been right, does not justify the doing what is wrong. Nor ought it to be presumed that the legislature meant to use a phrase in an unjustifiable sense, if by rules of construction it can be ever strained to what is just. The law books abound with similar instances of the care the judges take of the public integrity. Laws, moreover, abridging the natural right of the citizen, should be restrained by rigorous constructions within their narrowest limits.

Your letter, however, points to a much broader question, whether what have received from Mr. Evans the new and proper name of Elevators, are of his invention. Because, if they are not, his patent gives him no right to obstruct

others in the use of what they possessed before. I assume it is a Lemma, that it is the invention of the machine itself, which is to give a patent right, and not the application of it to any particular purpose, of which it is susceptible. If one person invents a knife convenient for pointing our pens, another cannot have a patent right for the same knife to point our pencils. A compass was invented for navigating the sea; another could not have a patent right for using it to survey land. A machine for threshing wheat has been invented in Scotland; a 2^d person cannot get a patent right for the same machine to thresh oats, a 3^d rye, a 4th peas, a 5th clover, &c. A string of buckets is invented and used for raising water, ore, &c., can a 2^d have a patent right to the same machine for raising wheat, a 3^d oats, a 4th rye, a 5th peas, &c? The question then whether such a string of buckets was invented first by Oliver Evans, is a mere question of fact in mathematical history. Now, turning to such books only as I happen to possess, I find abundant proof that this simple machinery has been in use from time immemorial. Doctor Shaw, who visited Egypt and the Barbary coast in the years 1727-8-9, in the margin of his map of Egypt, gives us the figure of what he calls a Persian wheel, which is a string of round cups or buckets hanging on a pully, over which they revolved, bringing up water from a well and delivering it into a trough above. He found this used at Cairo, in a well 264 feet deep, which the inhabitants believe to have been the work of the patriarch Joseph. Shaw's travels, 341, Oxford edition of 1738 in folio, and the Universal History, I. 416, speaking of the manner of watering the higher lands of Egypt, says, "formerly they made use of Archimedes's screw, thence named the Egyptian pump, but they now generally use wheels (wallowers) which carry a rope or chain of earthen pots holding about seven or eight quarts apiece, and draw the water from the canals. There are besides a vast number of wells in Egypt, from which the water is drawn in the same manner to water the gardens and fruit trees; so that it is no exaggeration to say, that there are in Egypt above 200,000 oxen daily employed in this labor." Shaw's name of Persian wheel has been since given more particularly to a wheel with buckets, either fixed or suspended on pins, at its periphery. Mortimer's husbandry, I. 18, Duhamel III. II., Ferguson's Mechanic's plate, XIII; but his figure, and the verbal description of the Universal History, prove that the string of buckets is meant under that name. His figure differs from Evans' construction in the circumstances of the buckets being round, and strung through their bottom on a chain. But it is the principle, to wit, a string of buckets, which constitutes the invention, not the form of the buckets, round, square, or hexagon; nor the manner of attaching them, nor the material of the connecting band, whether chain, rope, or leather. Vitruvius, L. x. c. 9, describes this machinery as a windlass, on which is a chain descending to the water, with vessels of copper attached to it; the windlass being turned, the chain moving on it will raise the vessel, which in passing over the windlass will empty the water they have brought up into a reservoir. And Perrault, in his edition of Vitruvius, Paris, 1684, fol. plates 61, 62, gives us three forms of these water elevators, in one of which the buckets are square, as Mr. Evans' are. Bossut, Histoire de Mathematiques, i.

86, says, “the drum wheel, the wheel with buckets and the Chapelets, are hydraulic machines which come to us from the ancients. But we are ignorant of the time when they began to be put into use.” The Chapelets are the revolving bands of the buckets which Shaw calls the Persian wheel, the moderns a chain-pump, and Mr. Evans elevators. The next of my books in which I find these elevators is Wolf’s *Cours de Mathematiques*, i. 370, and plate 1, Paris 1747, 8vo; here are two forms. In one of them the buckets are square, attached to two chains, passing over a cylinder or wallower at top, and under another at bottom, by which they are made to revolve. It is a nearly exact representation of Evans’ Elevators. But a more exact one is to be seen in Desagulier’s *Experimental Philosophy*, ii. plate 34; in the *Encyclopedie de Diderot et D’Alembert*, 8^{vo} edn. of Lausanne, 1st volume of plates in the four subscribed *Hydraulique*. Norie, is one where round eastern pots are tied by their collars between two endless ropes suspended on a revolving lantern or wallower. This is said to have been used for raising ore out of a mine. In a book which I do not possess, *L’Architecture Hidraulique de Belidor*, the 2d volume of which is said [De la Lande’s continuation of Montuclas’ *Historie de Mathematiques*, iii. 711] to contain a detail of all the pumps, ancient and modern, hydraulic machines, fountains, wells, &c, I have no doubt this Persian wheel, chain pump, chapelets, elevators, by whichever name you choose to call it, will be found in various forms. The last book I have to quote for it is Prony’s *Architecture Hydraulique* i., *Avertissement* vii., and (symbol omitted) 648, 649, 650. In the latter of which passages he observes that the first idea which occurs for raising water is to lift it in a bucket by hand. When the water lies too deep to be reached by hand, the bucket is suspended by a chain and let down over a pulley or windlass. If it be desired to raise a continued stream of water, the simplest means which offers itself to the mind is to attach to an endless chain or cord a number of pots or buckets, so disposed that, the chain being suspended on a lanthorn or wallower above, and plunged in water below, the buckets may descend and ascend alternately, filling themselves at bottom and emptying at a certain height above, so as to give a constant stream. Some years before the date of Mr. Evans’ patent, a Mr. Martin of Caroline county in this State, constructed a drill-plough, in which he used the band of buckets for elevating the grain from the box into the funnel, which let them down into the furrow. He had bands with different sets of buckets adapted to the size of peas, of turnip seed, &c. I have used this machine for sowing Benni seed also, and propose to have a band of buckets for drilling Indian Corn, and another for wheat. Is it possible that in doing this I shall infringe Mr. Evans’ patent? That I can be debarred of any use to which I might have applied my drill, when I bought it, by a patent issued after I bought it?

These verbal descriptions, applying so exactly to Mr. Evans’ elevators, and the drawings exhibited to the eye, flash conviction both on reason and the senses that there is nothing new in these elevators but their being strung together on a strap of leather. If this strap of leather be an invention, entitling the inventor to a patent right, it can only extend to the strap, and the use of the string of buckets

must remain free to be connected by chains, ropes, a strap of hempen girthing, or any other substance except leather. But, indeed, Mr. Martin had before used the strap of leather.

The screw of Archimedes is as ancient, at least, as the age of that mathematician, who died more than 2,000 years ago. Diodorus Siculus speaks of it, L. i., p. 21, and L. v., p. 217, of Stevens' edition of 1559, folio; and Vitruvius, xii. The cutting of its spiral worm into sections for conveying flour or grain, seems to have been an invention of Mr. Evans, and to be a fair subject of a patent right. But it cannot take away from others the use of Archimedes' screw with its perpetual spiral, for any purposes of which it is susceptible.

The hopper-boy is an useful machine, and so far as know, original.

It has been pretended by some, (and in England especially,) that inventors have a natural and exclusive right to their inventions, and not merely for their own lives, but inheritable to their heirs. But while it is a moot question whether the origin of any kind of property is derived from nature at all, it would be singular to admit a natural and even an hereditary right to inventors. It is agreed by those who have seriously considered the subject, that no individual has, of natural right, a separate property in an acre of land, for instance. By an universal law, indeed, whatever, whether fixed or movable, belongs to all men equally and in common, is the property for the moment of him who occupies it; but when he relinquishes the occupation, the property goes with it. Stable ownership is the gift of social law, and is given late in the progress of society. It would be curious then, if an idea, the fugitive fermentation of an individual brain, could, of natural right, be claimed in exclusive and stable property. If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Inventions then cannot, in nature, be a subject of property. Society may give an exclusive right to the profits arising from them, as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint from any body. Accordingly, it is a fact, as far as I am informed, that England was, until we copied her, the only country on earth which ever, by a general law, gave a

legal right to the exclusive use of an idea. In some other countries it is sometimes done, in a great case, and by a special and personal act, but, generally speaking, other nations have thought that these monopolies produce more embarrassment than advantage to society; and it may be observed that the nations which refuse monopolies of invention, are as fruitful as England in new and useful devices.

Considering the exclusive right to invention as given not of natural right, but for the benefit of society, I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not. As a member of the patent board for several years, while the law authorized a board to grant or refuse patents, I saw with what slow progress a system of general rules could be matured. Some, however, were established by that board. One of these was, that a machine of which we were possessed, might be applied by every man to any use of which it is susceptible, and that this right ought not to be taken from him and given to a monopolist, because the first perhaps had occasion so to apply it. Thus a screw for crushing plaster might be employed for crushing corn-cobs. And a chain-pump for raising water might be used for raising wheat: this being merely a change of application. Another rule was that a change of material should not give title to a patent. As the making a ploughshare of cast rather than of wrought iron; a Comb of iron instead of horn or of ivory, or the connecting buckets by a band of leather rather than of hemp or iron. A third was that a mere change of form should give no right to a patent, as a high-quartered shoe instead of a low one; a round hat instead of a three-square; or a square bucket instead of a round one. But for this rule, all the changes of fashion in dress would have been under the tax of patentees.

These were among the rules which the uniform decisions of the board had already established, and under each of them Mr. Evans' patent would have been refused. First, because it was a mere change of application of the chain-pump, from raising water to raise wheat. Secondly, because the using a leathern instead of a hempen band, was a mere change of material; and thirdly, square buckets instead of round, are only a change of form, and the ancient forms, too, appear to have been indifferently square or round. But there were still abundance of cases which could not be brought under rule, until they should have presented themselves under all their aspects; and these investigations occupying more time of the members of the board than they could spare from higher duties, the whole was turned over to the judiciary, to be matured into a system, under which every one might know when his actions were safe and lawful. Instead of refusing a patent in the first instance, as the board was authorized to do, the patent now issues of course, subject to be declared void on such principles as should be established by the courts of law. This business, however, is but little analogous to their course of reading, since we might in vain turn over all the lubberly volumes of the law to find a single ray which would lighten the path of the mechanic or the mathematician. It is more within the information of a board of academical

professors, and a previous refusal of patent would better guard our citizens against harrassment by law-suits. But England had given it to her judges, and the usual predominancy of her examples carried it to ours.

It happened that I had myself a mill built in the interval between Mr. Evans' 1st and 2^d patents. I was living in Washington, and left the construction to the mill-wright. I did not even know he had erected elevators, conveyers and hopper-boys, until I learnt it by an application from Mr. Evans' agent for the patent price. Although I had no idea he had a right to it by law, (for no judicial decision had then been given,) yet I did not hesitate to remit to Mr. Evans the old and moderate patent price, which was what he then asked, from a wish to encourage even the useful revival of ancient inventions. But I then expressed my opinion of the law in a letter, either to Mr. Evans or to his agent.

I have thus, Sir, at your request, given you the facts and ideas which occur to me on this subject. I have done it without reserve, although I have not the pleasure of knowing you personally. In thus frankly committing myself to you, I trust you will feel it as a point of honor and candor, to make no use of my letter which might bring disquietude on myself. And particularly, I should be unwilling to be brought into any difference with Mr. Evans, whom, however, I believe too reasonable to take offence at an honest difference of opinion. I esteem him much, and sincerely wish him wealth and honor. I deem him a valuable citizen, of uncommon ingenuity and usefulness. And had I not esteemed still more the establishment of sound principles, I should now have been silent. If any of the matter I have offered can promote that object, I have no objection to its being so used; if it offers nothing new, it will of course not be used at all. I have gone with some minuteness into the mathematical history of the elevator, because it belongs to a branch of science in which, as I have before observed, it is not incumbent on lawyers to be learned; and it is possible, therefore, that some of the proofs I have quoted may have escaped on their former arguments. On the law of the subject I should not have touched, because more familiar to those who have already discussed it; but I wished to state my own view of it merely in justification of myself, my name and approbation being subscribed to the act. With these explanations, accept the assurance of my respect.

A handwritten signature in black ink, reading "Th. Jefferson". The signature is written in a cursive, slightly slanted style.

[signed: *Th. Jefferson*]