THE BRIDGEPORT WOOD FINISHING CO. *v.* HOOPER AND ANOTHER.

Circuit Court, D. Connecticut. November 27, 1880.

1. PATENT PROCESS—WOOD FILLER.—The patent granted to James Perry, dated September 11, 1866, does not authorize an infringement of the patent granted to Nathaniel Wheeler, dated January 18, 1876, for a "new and useful process for filling the grain and finishing the surfaces of woods."
2. SAME—CHEMICAL SIMILARITY.—A grant of the exclusive right to use infusorial earth, or silicious marl, as a wood filler, does not also give the right to use quartz, flint, or feldspar, although it be conceded that each of the five articles is, substantially, silica.—[ED.

S. J. Gordon, for plaintiff.

Morris W. Seymour, for defendants.

SHIPMAN, D. J. This is a bill in equity, founded upon the alleged infringement of letters patent dated January 18, 1876, to Nathaniel Wheeler, assignor of the plaintiff, for a "new and useful process for filling the grain and finishing the surfaces of woods."

In the cabinet-maker's art it is necessary that the grain or the pores of the wood upon the surface should be filled with some material in order that the surface may be smooth, resist moisture, and receive a permanent polish. Divers materials and combinations of materials, such as bees-wax, copal, starch, pumice stone, plaster of Paris, and various gums have been used, but all proved ineffectual. They absorbed the varnish which was used for polishing, shrank, rolled out, or discolored the wood. What was needed was a non-absorbent, transparent article which would fill the pores and make a permanent, hard, smooth surface.

The process of finishing cabinet work without the use of a filler involved a large expenditure of money and of time. It is described by the patentee as follows:

"found" (in the Wheeler & Wilson Company's finishing department) "the system or process of finishing to be, first, as the work came from the cabinet maker to give it a heavy coat of oil; to let that dry a week or more; then sand-paper 64 the work with boiled linseed oil until the gum of the oil, the fiber of the wood, and the sand that came off the sand-paper produced a sort of gummy paste, which, in the process of rubbing, would lodge in the open pores of the wood, and which required much time and hard rubbing to fill the grains passably. This gum being composed of oil required much time to dry; otherwise, if varnished before it was dry, it would shrink in drying, and crack and displace the varnish. This was the process of finishing all the ordinary work. The finer quality of work, known as 'hand-polish finish,' required to be varnished with from three to five coats of what is known as scraping varnish, which, when dry, was scraped off with a cabinet-maker's steel scraper, leaving none of the many coats of varnish on the work, except that in the grains of the word below the surface, after which from three to five coats of polishing varnish were applied; then the work was rubbed down with pumice stone and water, and polished up with rotton stone and the hand; the palm of the hand bringing the polish up. This process is the same as heretofore used by all the piano makers in the country."

The invention, and the difficulties which it was intended to obviate, are thus described in the specification: "Heretofore various materials have been used to fill the grain in processes of finishing woods, such as pulverized marl, clay, flour, chalk, starch, and different gums; but all are found to have objectionable features in use, which my new process is designed to obviate. In some of the substances employed the particles, when powdered, are round or spherical, and without angles, and consequently do not readily adhere

to each other and unite with the pores of the wood, and others are wanting in durability, and subject to injurious atmospheric action. I am also aware that various forms of infusorial silicates have been used in mixtures for filling the grain of wood, but these are all very powerful absorbents of liquids, and carry the moisture by the quality of their capillarity into the wood itself, which has to be removed by evaporation before the varnish can be applied to the surface of the wood, and which opens the pores when said moisture is evaporated, and prevents it from being solidified, 65 or producing a hard or smooth surface ready for the varnish.

"use finely-powdered flint, quartz, or feldspar, which are non-absorbents of moisture or liquid of any kind, and which fill the pores of the wood by the particles packing together similar to a concrete, and which are combined with any fluid substance that will permit them being rubbed into the surface, such as oil or varnish, or other similar fluids; the finely-powdered flint or quartz being so mixed to about the consistency of jelly, and colored if desired, to match the wood to be filled and polished. I apply the mixture with a pad of cloth or leather to the wood, and rub it into the pores until they are full, when, by a little continuous rubbing, the surplus material will adhere to the pad or cloth until the whole surface of the wood is cleaned off, leaving the pores of the wood entirely packed, and, when dry, presenting a smooth, hard, and glassy surface, of great durability, upon which one coat of varnish will produce all the finish desired for fine furniture."

The claim is: "in the art of filling wood, the employment of finely-powdered flint, quartz, or feldspar, mixed with oil or other fluent substance, substantially as described."

The invention has proved to be a great success. The filler has gone into extensive use, and has effected

a very large saving of time and expense in the manufacture of furniture, and is used upon the finest work. It makes a hard, permanent, and glassy or transparent surface, impenetrable to oil or moisture, leaves the wood in its natural color, and requiring the application of but a single coat of varnish. The reasons of its superiority consist in its non-absorbent quality, and mainly "in the peculiar nature of the ground quartz. The particles being angular, sharp, and, I might say, needle-pointed, they readily enter into and unite with the fiber of the wood, and, when once united with the fiber of the wood, it is impossible to displace them, and when large orifices require to be filled the particles readily pack one upon another, and become permanent and solid." The jelly-like mixture of oil and varnish, with the quartz, forms, when 66 rubbed into the pores of the wood, "a hard, impenetrable substance, which in itself forms a protection to the wood."

The defendants made and sold, prior to the date of the bill and after the assignment of the patent, wood filler which is substantially the plaintiff's article, and, like the plaintiff's, made from powdered quartz. It is not denied that the manufacture and sale of this material is an infringement of the plaintiff's patent. *Goodyear* v. *N. J. C. R. Co.* 1 Fisher, 626.

The principal defence is that the defendants had the right to use the material under a license from James Perry, to whom was granted a patent, dated September 11, 1866, which it is claimed includes the Wheeler patent. The specification and claims of the Perry patent are as follows: "This invention consists in the use of a certain clay or marl, known to chemists as 'silicious marl' or 'infusorial earth,' in the process of filling the grain of wood to be polished. The operation is effected in a similar manner to that in which other materials for the same purpose are used; that is, by rubbing the substance well into the pores and grain of wood

in order to produce a close, hard surface, capable of being highly finished; rotten stone and plaster of Paris being the most common materials used in this process.

"infusorial earth, such as my invention embraces, may be used in the same state in which it is taken from the earth, viz., an impalpable dust or powder of silicious character, or it may be prepared for use in a manner which I will now describe. One-half ounce of sal ammoniac, (muriate of ammonia,) one-half pound of white vitriol, (sulphate of zinc,) one ounce of gum arabic, and half a gill of gum tragacanth, (dissolved in water,) are put into two quarts of water, and stirred until the whole is dissolved. Six pounds of silicious marl are then well stirred up in the solution, and, if it is proposed to give the material any shade of color or dye, the requisite coloring matter can be put in at this point; the whole mass being well mixed up together. A pint and a half of linseed oil is also thoroughly stirred up in it. A chemical affinity is produced by the mixture of these ingredients, the bases and salts contained uniting the oil, water, and marl, and the preparation

thus obtained produces the most effective agent for the purposes of the cabinet maker, producing a more perfect polish upon the surface of the wood, and being more easily and conveniently applied than any other material for this object in use.

"The advantages obtained by the use of this substance are very important, especially to manufacturers on a large scale, where cheapness of material in an agent so extensively used as this class, to which my invention belongs, makes such a vast difference in the profits of the trade. This earth being often found in large quantities, and then the superior qualities it has in polishing and filling wood, render it of great value to the cabinet maker, carriage maker, and others in similar occupations.

"Now, having described my invention, what I claim as new, and desire to secure by letters patent, is: *First,*

the use of silicious marl or infusorial earth for the purpose of filling and polishing wood, substantially as herein set forth; and, *second,* the combination of silicious marl with any or all of the substances herein named, sulphate of zinc, muriate of ammonia, gum arabic, gum tragacanth, and oil, substantially in the manner and for the purpose herein set forth."

The Perry article, as described in his patent, is not now used, and, in my opinion, is not valuable.

The theory of the defendants is this: Flint and quartz are chemically silica, more or less pure, or what is known to chemists as silicic acid. Feldspar is a silicate of alumina and potash, and contains silica in large proportions. Quartz and flint contain from 85 to 100 per cent. pure silica. Infusorial earth is a fine-grained earth, formed by the deposition of the silicious coatings or shells of microscopic plants called *infusoria,* on the bottom of ponds or lakes of water, and is mostly silica mixed with carbonate of lime and other impurities. Silicious marl is a mixture of clay and carbonate of lime and silica in the form of sand or infusorial shells. Silicious marl contains from 20 to 50 per cent. of silica. As, therefore, quartz or flint contains from 85 to 100 per cent. of silica, and infusorial earth and feldspar are mostly silica, 68 and silicious marl contains 50 per cent. of the same chemical substance, a grant of the exclusive right to use infusorial earth, or silicious marl, gave also the right to use quartz, flint, or feldspar; the five articles being, substantially, silica.

The sufficient answer to this theory is that, acknowledging the facts which have been stated to be true, and that these articles are, chemically, very similar, yet practically, for use in the arts, the respective classes of articles which are named in the two patents possess very different properties.

Infusorial earth is a vegetable tissue, "porous and delicate in structure," friable and of chalky texture, and not possessing the hardness and sharp angles

and needle-like points of powdered quartz, flint, and feldspar, qualities which cause the quartz, flint, or feldspar to find a permanent lodgment in the pores of the wood, and to thoroughly fill them, so that a new, hard, unabsorbent, permanent surface is formed. As charcoal and the diamond are alike chemically composed of carbon, yet are very different substances in the arts, and are used for different purposes, so quartz and infusorial earth, though chemically similar or substantially identical, are dissimilar in the uses to which they are adapted. Infusorial earth, though chemically silica, is unfitted for the purposes of filling wood, for the reasons which render chalk or starch unfitted, while powdered quartz has been found to possess qualities which make the plaintiff's article the only efficient and useful filler known to the cabinet manufacturers of the country. Silicious marl is as illy adapted as infusorial earth, because, while marl contains more sand than is found in infusorial earth, yet the sand is in rounded and not angular grains. Feldspar breaks, like quartz, into angular fragments, and is also non-absorbent.

The chemical character of the articles named in the two patents, and the difference for practical use between the two classes of articles, are tersely and clearly stated in the following extract from the testimony of Prof. Samuel W. Johnson, one of the experts called by the plaintiff. The scientific experts of the respective parties were not at variance in regard to the scientific facts, or the scientific conclusions from the 69 facts. The defendant's expert was not called upon in regard to the differences between the properties of the two articles with reference to their practical use. Prof. Johnson testified:

"By the term 'silicious marl' I should understand a fine, sandy, or earthy material, consisting of clay, silica, in the two forms of sand, and so-called infusorial shields, which are the skeletons of microscopic plants.

The infusorial earth consists more largely or chiefly of these infusorial shields. Both the terms 'silicious marl' and 'infusorial earth' are considerably indefinite, and a large variety of different materials may be classed under these names. In the state of New Jersey there occur various deposits, bearing the names 'green sand marl,' 'chocolate marl,' 'gray marl,' 'ash marl,' 'shell marl,' differing in color, coarseness of grain, chemical composition, to any or all of which the term 'silicious marl' would not be inappropriate. There is, however, no distinctive character which I could name that would separate any particular earth, as 'silicious marl,' from one hundred or one thousand other earths, differing from each other obviously in texture, color, and chemical composition. Infusorial earth is, on the other hand, characterized by the presence in it of the infusorial shields, so-called, recognizable by the microscope. From the fact that marls of all kinds are sediments from water, and that infusorial plants inhabit and perish in water, most marls contain more or less infusorial shields, so that silicious marls and infusorial earth cannot commonly be sharply discriminated.

"Quartz, chemically, is oxide of silicon. It contains no hydrogen, and yields no water when heated; its specific gravity is 2.65; it will not readily dissolve in a boiling aqueous solution of potash or soda, even when finely pulverized. This specimen of infusorial earth, (Exhibit M,) which consists very largely of the skeletons of microscopic plants, is chemically oxide of silicon plus water, and when heated gives off several per cent. of water. Its specific gravity is less than that of quartz; it is softer than quartz; it dissolves with the greatest ease, to a large extent, in a boiling aqueous solution of potash 70 or soda. It is, therefore, chemically distinct from quartz, and is classed by mineralogists with the opal, as a mineral species distinct from quartz. In support of which I would refer

to Dana's Text-book of Mineralogy, published by John Wiley & Sons, 1877, pages 262 to 267, inclusive, on which last page, under the species opal, reference is made to infusorial earth, and where the statements which I have made as to its density and hardness are corroborated.

"in respect to their properties as applied to the filling of wood, I would call attention to the fact that the two boxes, Exhibits L and M, contain the same weight of their respective contents. The mass of quartz, weighing four pounds eleven ounces, is about seven inches long, three inches wide, and four inches high. The infusorial earth occupies a box ten inches long, seven inches wide, and five inches high, being in the form of lumps of various sizes, but are evidently several times more bulky than the same weight of quartz, and several times more bulky than the quartz would be if it were reduced to powder such as is specified as employed in the Wheeler patent. This great difference is due to the porosity of the infusorial earth. Not only are the lumps of infusorial earth made up of loosely-cohering infusorial shields or fragments of shields, but these shields themselves have a very delicate structure, as seen under the microscope, so that the infusorial earth, from its spongy texture, is capable of absorbing and holding in its pores a considerable bulk of liquid.

"This difference of mechanical texture corresponds to a difference in the adaptation of these two materials to use as a wood filler. The infusorial earth is porous in a degree comparable to the wood which it is claimed to fill, so as to diminish the absorption of oil or varnish, and must therefore act very inefficiently as a filler.

"Again, the quartz, powdered, as specified in the Wheeler patent, is seen under the microscope to consist of sharp, angular particles, which, when applied to the surface of wood, by rubbing with a cloth or

leather pad, are forced into the pores of the wood, where they firmly lodge, and effectually fill these pores with an impervious material. The hardness of quartz

is such that, in the process of filling, its particles are not further pulverized to any appreciable extent, but are simply forced into the wood, from which they cannot be easily dislodged. Infusorial earth, on the other hand, is friable under pressure and friction, and has a chalky rather than a gritty texture. It presents no angular fragments which can be rubbed into the pores of the wood, so as to fill them with an unabsorbent material.

"Quartz is a crystallized silica of mineral origin, and, in common with all crystals of such origin, has no porosity that can be detected by the highest magnifier, and is, in mass, absolutely impenetrable to water, oil, or other similar liquids. Infusorial earth, on the contrary, is a hydrated silica that has been organized into the structure of a plant, and, in common with all vegetable tissues or organized structures, is porous and delicate in structure, so that, in respect to texture, hardness, sharpness, it is quite the opposite of powdered quartz in its applications as a wood filler.

"The fact that both quartz and infusorial earth consist, the first entirely, and the second largely, of silica, or the oxide of silicon, establishes no practical identity between them for the technical uses of the arts, and especially for use in wood filling, any more than the fact that the diamond and charcoal consist, essentially, of carbon, proves the value of the diamond for fuel, or of charcoal as a gem."

The sand or silica found in silicious marl is, chemically, identical with pulverized quartz, "inasmuch as both consist of oxide of silicon or quartz, "inasmuch as both consist of oxide of silicon or quartz, but, physically and practically, for the purposes of wood filling, different, because the sand mixed with infusorial earth, being a geological sediment, consists

of rounded water-worn grains, while powdered quartz of the Wheeler patent consists of angular, sharp-edged fragments and splinters."

An attempt was made by Mr. Perry to show that he gave the patentee knowledge of the use of powdered quartz, but this defence is without foundation.

Let there be a decree for an injunction against the defendants, and for an accounting.