

the prior public use of the machine made by Livermore; that being sufficient to support the decree appealed from. *Fruit-Jar Co. v. Wright*, 94 U. S. 92; *Egbert v. Lippmann*, 104 U. S. 333, 336; *Andrews v. Hovey*, 124 U. S. 694, 701, 8 Sup. Ct. 676; *Jones v. Barker*, 11 Fed. 597.

The decree in the court below must be affirmed, with costs.

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BENJAMIN et al. v. CHAMBERS & McKEE GLASS CO.

(Circuit Court of Appeals, Third Circuit. December 7, 1893.)

No. 22.

1. PATENTS—NOVELTY—GLASS-MELTING TANKS.

A tank for continuous melting of glass, having gas and air ports, and differing from previous tanks only in being over 18 inches deep, presents no patentable novelty, either in the formation of a semifluid layer below the upper fluid portion of the metal, as that result was shown in the patents of C. W. Siemens of 1868, 1876, and 1877, and of Leuffgen of 1870, or in the vertical fining produced, also shown in the Siemens' patents to have been well understood. 51 Fed. 902, affirmed.

2. SAME—ANTICIPATION.

Such a tank was anticipated by the Belgian patent of 1877 to C. W. Siemens, and by Granger's patent of 1868, which cover tanks exceeding 18 inches in depth. 51 Fed. 902, affirmed.

3. SAME—VALIDITY.

Siemens' patent, No. 261,054, for glass-melting tanks, is void for want of novelty and for anticipation. 51 Fed. 902, affirmed.

Appeal from the Circuit Court of the United States for the Western District of Pennsylvania.

In Equity. Suit by George H. Benjamin, Alexander Siemens, Joseph Gordon Gordon, and John Wreford Budd, executors, etc., of Sir William Siemens, deceased, Frederick Siemens, and Alexander Siemens, trustees, and Frederick Siemens, against the Chambers & McKee Glass Company, for infringement of patent. Bill dismissed. 51 Fed. 902. Complainants appeal. Affirmed.

Thomas B. Kerr and George H. Christy, for appellants.

James L. Kay and Francis T. Chambers, for appellee.

Before DALLAS, Circuit Judge, and BUTLER and GREEN, District Judges.

BUTLER, District Judge. The bill charges infringement of patent No. 261,054, issued to Frederick Siemens, July 11, 1882, for "improvements in the construction and method of working glass-melting furnaces." A patent for the same invention was granted to C. W. Siemens in France, November 22, 1879.

The specifications are lengthy, discursive, and indefinite—containing many repetitions and leaving the mind in some doubt respecting the invention intended to be secured. They commence with a statement of the class of glass-melting furnaces to which the invention relates, and then proceed to say that:

"Glass-melting tanks have heretofore been constructed under the belief that the "fining" operation of the material takes place mostly at the surface, and consequently such tanks have been made of considerable superficial area, but of very moderate depth—such as a foot or 18 inches. \* \* \* It has been discovered however that in the glass-melting process the metal as it fines sinks below the surface, and consequently, in order to work out the metal to the best advantages, the depth of the tank should be very considerably increased so that below the fluid molten metal there may be a layer of metal in a semifluid or partially solid condition lining the bottom of the tank."

Of his tank he says:

"The tank, D, is made over eighteen inches in depth for the following reasons: In continuous melting tanks shown in former patents, the surface of the metal subjected to the action of the flame was made considerable, in order to permit of the reactions taking place in the upper portion of the current traveling toward the working holes. These dispositions appeared indispensable, for the lower portion of the metal in the tank is chilled by contact with the bottom, which is kept actively cooled by circulation of air to prevent leakage of the glass through the joints. By increasing the depths of the tanks to a sufficient degree while maintaining an active circulation of air beneath, the metal under treatment is maintained quite fluid to a depth of about eighteen inches, and it has been found not only possible but advantageous to reduce the surface metal subjected to the action of the flame, for the reason that the reactions among the particles occur in this case during their descent from the higher to the lower zones of fluid metal. \* \* \*

"The advantage to be obtained from increasing the depth of these tanks will be the formation of a layer of chilled glass on the surface of the bottom, at which point the movement of the particles ceases, whereby the bottom blocks will be protected from wear, the presence of stones in the glass avoided, and a larger proportion of first-quality glass will be produced."

The claim is as follows:

"A tank for the continuous melting of glass, having gas and air ports, and of the depth herein described, for the purpose of forming below the upper fluid portion of the metal a layer of metal in a semifluid or partially solid condition, as and for the purposes described."

A process claim was rejected; and the one allowed was obtained with considerable difficulty. A brief reference to the method employed in the manufacture of glass will facilitate an understanding of the case. We will adopt what the circuit court has said on the subject:

"The materials were formerly melted in pots about thirty-nine inches deep. They were expensive to construct, and subject to frequent breakages, caused by the variations in temperature between the melting and working processes. They were charged with batches of materials for making glass, placed in furnaces and subjected to great heat, the batches renewed as the melting went on, until they were filled with molten glass, when they were allowed to cool, and the glass grew stiff enough to work. This intermittent process resulted in great loss of time, fuel and material. There are four processes in glass making: First, melting; second, clarifying or fining; third, planing; and, fourth, working out.

"The tendency of inventive minds for the last thirty years, to overcome these difficulties, has been towards tank furnaces. By means of them pots have been dispensed with and a continuous method of working reached, the batch being constantly fed at one end and worked out at the other. In large measure they have revolutionized the glass business. These tanks hold great beds of glass; some of them are one hundred and twenty feet long by twenty feet wide, and of varying depths from two to six feet. Large bricks or blocks placed underneath at some distance apart, between which the molten glass can run, form their bottoms. They are placed on pillars or arches, thus forming a cave through which a cool

circulation of air passes, and the molten glass immediately over them is thus chilled and prevented from escaping through the crevices between the blocks—the molten glass being drawn off a short distance above. \* \* \* In this progress the Siemens brothers bear a distinguished part. They first applied the regenerative gas furnace for glass melting; and the cave principle was their work; these important features, and many others, the result of their inventive genius, were all patented."

Before passing to an examination of the claim it may be well to see what Mr. Benjamin, one of the plaintiffs, who appeared as an expert witness, says of the invention and patent:

"The particular invention set out in the letters patent, I understand to relate to the construction of glass furnaces of the general type set forth in the patents 127,806 and 230,667. That is to say, a tank for the continuous melting of glass, having gas and air ports, but differing from the construction set forth in the patents just named, by having such a depth of tank that there shall be formed below the upper fluid portion of the metal in the tank, a layer of metal in a semifluid or partially solid condition. By the term 'metal' I mean the combined or combining glass-making materials which are employed to make glass. The depth of the tank, I understand from the patent in suit, should be such as to permit the necessary refining (melting and combining of the glass-making materials) of the glass in the tank, without permitting the particles of glass in the process of 'fining' to be brought into contact with the bottom blocks of the tank. In other words, that the depth of the tank should be such as to allow the fining operations therein in transforming the glass-making materials from batch to planed metal, to take place in a vertical direction above the body of metal in a semifluid or partially solid condition lining the bottom of the tank.

"From the patent I learn that the depth of the tank must be over eighteen inches to permit the fining operation to take place in a vertical direction, as the patent says that 'the metal under treatment is maintained quite fluid to a depth of about eighteen inches.' I understand from the patent that, while the metal is kept quite fluid for a depth of about eighteen inches, there is formed under this fluid layer a layer of metal in a semifluid or partially solid condition, or what is spoken of in the patent as 'a layer of chilled glass on the surface of the bottom of the tank, at which point the movement of the particles in a vertical direction in fining ceases, and whereby the bottom blocks will be protected from wear, the presence of stones in the glass avoided, and the proportion of first-quality glass produced increased.'

"The differentiation between the furnace described in this patent No. 261,054 and that set forth in the former patents of Siemens consists in the fact that the furnaces described in the earlier patents of Siemens were constructed under the belief that glass would fine in a horizontal direction. In other words, that the decomposition of the glass-making materials and their recombination into planed glass took place upon the surface and in its zone of highest temperature, and the formed metal, by its greater specific gravity, was precipitated and gradually worked its way horizontally towards the gathering end of the furnace. For this reason tanks were made of a depth of a foot or eighteen inches, so that the whole mass of metal in the body of a tank might be continuously exposed to a temperature approximately equal to that upon the surface and so produce more rapid fining of the glass.

"The tank described in patent No. 261,054 is constructed to carry out the theory that glass fines in a vertical direction; that decomposition of the glass-making materials takes place mainly upon the surface and recombination to form planed metal during the descent of the metal, and is completed at or near the bottom of the zone of fluid glass; that the particles in falling in a shallow tank of the construction shown in Siemens' former patents are brought into contact with the material of which the bottom of the tank is composed, thereby acting both chemically and mechanically to eat into and to decompose the bottom of the tank, and filling the tank with melted glass mingled with particles of decomposed bottom block, thereby giving rise to what is known as 'stones, seeds and cords' in the glass.

"To overcome this the tank described in complainants' patent is made of such a depth that the fining operation takes place vertically, and the particles in their descent come in contact at their lowest zone of motion with a body of semifluid or partially solid glass which lines the bottom of the tank, and can, under no condition of proper employment of the furnace, come in contact with the bottom blocks of the furnace. By reason of this construction, furnaces of this class and construction have been given the name by the Messrs. Siemens of 'deep-tank' furnaces."

We have thus copied largely from Mr. Benjamin's testimony (selecting the particular parts relied on by his counsel) for the purpose of presenting the full strength of their case.

We have seen what the claim of the patent is in terms. What does it embrace? Simply a tank for the continuous melting of glass, "over eighteen inches deep," having gas and air ports. The additional terms are a statement of its use. As the gas and air ports are old, nothing is left but the prescribed depth. This of course will not sustain the claim, unless the tank, by reason of the increased depth, discharges some new and useful function. The plaintiffs say it does—not one only, but two: the creation of a "semifluid layer," as described in the claim, and "vertical fining," as described by Mr. Benjamin—but not alluded to in the claim. There is no doubt that the "semifluid layer," and "vertical fining" result from the use of this tank. But is either new?

As respects the first the proofs show that it is not. Mr. Benjamin himself substantially admits it. He says:

"One of the most radical improvements made in the tank furnace was the substitution by C. W. Siemens of a cooling cave for the air channels under the bottom of the tank whereby the ventilation was greatly improved. By the use of this improvement and by the effective cooling of the tank sides, they succeeded in forming a lining of glass upon the sides and bottom, which protected the tank against the injurious action of the heat and glass-making materials."

Nothing more than this is claimed or suggested by the claim, or specifications. The several patents of C. W. Siemens, of 1868, 1876, 1877, and that of Leuffgen of 1870, show the "semifluid layer." In the plaintiffs' brief, (page 60,) it is said:

"In regard to the foregoing statements in the opinion of the lower court, we desire to submit that while it is true that prior to the invention in suit, tank furnaces were provided with cooling appliances to protect the sides and bottom by forming a layer of chilled glass on the inner surface thereof, it is not true that such layer was always hard enough to stand against the side, and was not also recognized as immobile or quiescent fluid."

To us this seems to be a full admission that the "semifluid layer," contemplated by the patent is old. The reservation contained in the last two lines appear to be unimportant. It is not relevant to anything in the case, as we understand it. The terms of the specifications, in this respect are "so that below the fluid molten metal there may be formed a layer of metal in a semifluid or partially solid condition, lining the tank;" and the claim is in similar terms. The admission seems therefore as broad as the claim. The language is an accurate description of what was done by the use of every tank constructed for the continuous melting of glass. It would be a waste of time to enlarge on this subject.

Is the other function new? The term "vertical fining," is not contained in the patent; nor is the subject of "fining" generally alluded to in the claim. To ascertain what "vertical fining" is, we must first ascertain what constitutes "fining," generally. The latter is not easily done; the proofs leave us in doubt. Is it that part of the process of melting in which particles of the mass, freed from gas, and impurities, sink and find their level? Or is it the act of purifying and combining, in the formation of glass? Whether it be the one or the other, however, it results from the influence of heat, alone, and has occurred under all known methods employed in the manufacture of glass. Time out of mind glass has been made by melting mixtures of sand and alkali in crucibles. For many years the crucibles have consisted of large tanks; and the contents been subjected to continuous heat on the surface. As the ingredients melt they gradually form a mixture of glass more or less perfect, sand, etc. By maintaining the requisite temperature the effect called "fining" is produced. The proportion of glass increases, and being heavier than the unpurified balance of the mass, sinks, while the latter rises. Thus there is a constant motion of the particles upward, and downward, and to some extent laterally—the purer glass forming the lower strata, with the less pure and refuse above. If therefore the term "fining" signifies that part of the process of melting, in which the purified particles sink and find their level, then "vertical fining" was well understood long before 1879. In the Italian patent of C. W. Siemens of 1877, it is said:

"The composition melts gradually under the influence of heat developed at the surface: then in proportion as the glass melts and refines, it gains the bottom of the tank. As the heating takes place by the reverberation of heat upon the surface, while the bottom is energetically cooled, when a molecule of glass is refined at the surface, and has consequently acquired a greater density, it gains the bottom and is replaced at the surface by a molecule of greater density."

Prof. Silliman, in a lecture before the American Institute of Mining Engineers, (as appears by the record,) says:

"The fundamental idea upon which all the Siemens' glass patents are based, is founded in the cardinal fact, before overlooked, or not availed of, that in the melting or 'fining' of glass there is an important difference of density in the product, in the successive stages of the process, the glass being denser, and falling by gravity to the bottom, while the less refined floats on the surface of the denser glass, bearing with it the 'scum' or 'stone,' so-called, imperfectly melted material, and impurities. The Siemens brothers, with characteristic sagacity, seized on this fact, and developed out of it a new system of glass furnace, and glass manufacture."

An examination of the several Siemens' patents for glass-melting furnaces, issued before 1879, shows the accuracy of the foregoing statement. That such "fining" occurs throughout the molten mass, as well as at the surface, was equally understood, though it may have been believed to occur principally at the latter point. This understanding is expressly stated in the patent before us.

But suppose the term "fining" is to be understood as signifying the act of purification and combination of particles, and that the patentee discovered that such purification and combination principally occurs in their descent, is the plaintiffs' situation improved?

Of course the discovery is unimportant if the patent does not secure it. The claim for a method of glass manufacture, as we have seen, was disallowed. If the advantages of the discovery are not therefore embodied in a new function of the tank, the discovery is not secured. Does the tank perform a new function in this respect? We have seen that "fining" occurs, and has always occurred to a greater or less extent, throughout the entire mass; and it occurs doubtless not only in a downward direction, but in every other in which the particles may be driven by the forces set in motion. Even what Mr. Benjamin calls "vertical fining" is therefore old. It is a necessary consequence of melting glass-making materials, in all tanks that have ever been employed for the purpose. Mr. Benjamin says the "fining" which occurs as the particles descend is different from that which takes place at the surface. He does not explain how it is different, nor what causes the difference; nor does any one else. The patent does not suggest any such difference. It is unnecessary, however, to dwell on this scientific problem, or even to determine what "vertical fining" is; for conceding Mr. Benjamin's conclusions to be right the same description of "fining" was old. It was not only practiced in all crucibles, but was well understood by C. W. Siemens in 1872, and is described in his French patent of that date. In speaking of the descent of the heavier particles under the influence of heat, he says:

"There results from these vertical movements, combined with the general advancement of the glass, from the charging doors to the gathering ports, a pugging, so to speak, of the glass mass, which imparts to it homogeneity, and augments its fineness, and improves its quality."

It seems difficult to distinguish this from Mr. Benjamin's definition of "vertical fining." But suppose "vertical fining" was not previously understood, though practiced, what is the result? The patentee discovered that a greater degree of "fining" occurs below the surface than was formerly supposed. Of what avail has his discovery been? What did he do in consequence? Nothing whatever but increase, immaterially, the depth of the old tank. No new function is secured thereby. In every old tank, as we have seen, "fining" of precisely the same character, was performed, and in the same manner. Even if he effected a degree of improvement in the result it would not sustain his patent. But the increased depth is too immaterial to influence the result. The old tanks were 18 inches deep. His specifications say so—"a foot to eighteen inches." He makes his, (according to the patent,) "over eighteen inches." He thus covers everything above the depth of the old tank. One or two inches, or half an inch, distinguishes his tank from the old. It is true Mr. Benjamin says they manufacture the tank very much deeper; but this is unimportant. If the patent can be sustained at all it must be for one "over" 18 inches, no matter how little over. It is plain that this difference between the old tank and that of the patent is immaterial, in all respects. Thus it appears that his tank neither performs a new function nor improves an old one. Mr. Benjamin sums up, in a single sentence, his understanding of what the patentee did:

"He succeeded in getting a tank which was practically lined with glass, and in which the fluid glass could fine vertically (its natural movement produced by the combined effects of the melting temperature and gravity) being permitted to take place without limitation or restriction."

And he claims to have accomplished this by adding an inch, more or less, to the depth of the old tank! As we have seen, his description of the functions of this tank apply with equal truth to those of the old ones of 18 inches.

While it seems unimportant to go further, we do not hesitate to say that we think the patentee was anticipated even as respects the specified depth. He does not appear to have been first to manufacture similar tanks of "over eighteen inches" deep. C. W. Siemens' Belgian patent of 1877, and Granger's patent of 1868, seem to cover deeper tanks, and appear to be in no material respect distinguishable from his. The criticism on the measurement of the first, and the effort to distinguish the latter by the fact that it calls for pots instead of a tank, and shows some other apparently immaterial differences, present no serious difficulty. The measurement in the one case leaves no reasonable doubt respecting the depth, and it is not we think, in conflict with the authorities cited; and in the other the pots are used in place of tanks.

It is unnecessary to examine the question of infringement. For the reasons stated the decree dismissing the bill is affirmed.

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FULLER & JOHNSON MANUF'G CO. et al. v. STEVENS et al.

(Circuit Court, N. D. New York. December 22, 1893.)

1. PATENTS—EXTENT OF CLAIM—PRIOR ART—TRANSPLANTERS.

The fifth claim of the Bemis patent, No. 423,723, for improvements in transplanters, must be narrowly construed, in view of the prior art, as shown in the Bowman & Selby patent, No. 115,688, and the Vivion patent, No. 194,745, both for improvements in planters.

2. SAME.

The third, fourth, and sixth claims of the Bemis patent, No. 423,724, and the fifth claim of the Starks & Felland patent, No. 486,200, both for transplanters, if valid at all, must be strictly limited, and are not infringed by defendants.

3. SAME.

Claims 1, 2, 3, 4, 5, 6, 7, and 8 of the Starks & Felland patent were not anticipated, and are valid as to the precise combinations shown.

In Equity. Suit by the Fuller & Johnson Manufacturing Company and Frank A. Bemis against Abram W. Stevens and Leroy W. Stevens for infringement of patents. Decree for complainants.

C. H. Duell, for complainants.

J. H. Whitaker, for defendants.

COXE, District Judge. This is an equity action for the infringement of three letters patent, Nos. 423,723 and 423,724, granted March 18, 1890, to Frank A. Bemis, and No. 486,200, granted November 15, 1892, to Starks & Felland, for improvements in transplanters. The claims involved are the fifth claim of No. 423,723, the third,